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PREDICTIVE TECHNIQUES FOR WATER QUALITY: INORGANICS

Joe O. Ledbetter, et al

Texas University

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PREDICTIVE TECHNIQUES

for

Water Quality–Inorganics

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AUSTIN, TEXAS

The University of Texas

Department of Civil Engineering

Environmental Health Engineering Laboratories

PREDICTIVE TECHNIQUES FOR WATER QUALITY--INORGANICS

by

Joe O. Ledbetter, Assistant Professor

and

Earnest F. Gloyna, Professor and Director
of the Environmental Health Engineering Laboratories

December, 1962

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Appreciation must also be expressed to Jerome H. Svore, Keith S. Krause, and Aleck Alexander, all of the U.S. Public Health Service, for aiding in a familiarization with this problem.

Joe O. Ledbetter
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Austin, Texas
December, 1962

ABSTRACT

This research takes the hyperbolic relationship between quality and quantity that is formulated as

$c = K Q^b$, where c = the mineral concentration,
Q = the stream discharge, and
K and b = regression coefficients

and refines this correlation for use on rivers of the Southwest or of other semi-arid regions. This refinement consists of making b variable and estimating it from either

$b = p Q^n$, where b = the exponent for above equation,
Q = the stream flow, and
p and n = regression coefficients

or

$b = f + g \log Aq + h Q^n$, where Aq_k = antecedent flow index $= \sum_{i=1}^{30} \frac{Q_i}{i}$,
i = the number of days back from the kth day, and
f, g, h, and n = regression coefficients.

A modified Cauchy function is used to fit frequency curves for both quantity and quality. This function is

$$h(q) = \frac{A k q^{k-1}}{(1 + q^k)^2},$$ where h(q) = probability density,
q = the reduced variate = x/x_{median},
and A and k = parameters of fit.

Gumbel's methods of extremal statistics are applied to the frequencies of extremes for quality and inorganic quality.

A mathematical model for making a materials balance analysis of the chlorides in rivers of the Southwest is presented.

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I. INTRODUCTION

The aim of this investigation was to develop predictive methodology for inorganic water quality in the rivers of the Southwest. The mathematical models for these techniques were formulated for parameter evaluation and processing on the electronic digital computer. The applications pointed out here are thought to be original even though some of the methods employed are not new. Correlations and frequency analyses are made for data on the Red and Canadian Rivers. A materials balance method for use on rivers of the Southwest or other semi-arid areas is delineated.

Purpose of the Investigation

The purpose in doing the work was to satisfy an existing need for improved methods of predicting the probable quality of water. The engineer who must plan water usage has long been apprised of the importance of being able to make such predictions of water quality. The need for better predictions, though rather urgent now, will become even more acute as the population of the area increases and the technological development accelerates. The types of remedial measures to be employed on quality-deficient waters will depend upon the use to be made of the water and the probable quality of the water before the improvements are instituted. It is not, however, within the scope of this work to ascertain or to recommend what type of treatment to use in any improvement program.

Description of the Rivers

The data used were for rivers of the Southwest with flows that were essentially unregulated by reservoirs and the methods derived are intended to apply to this or to other semi-arid regions. Most of the methods applied here should be applicable to rivers in other places; however, less sophisticated mathematical models could probably be applied to those areas with more water and less variation of flow.

The principal differences between the rivers of the Southwest and those of other areas are the wide fluctuations in flow, the cross-sectional shape of the river, the high dissolved mineral content, and the high rate of evaporation in this area. An illustration of the wide variations in flow may be drawn from the minimum flow of 1.1 cfs and the maximum flow of 281,000 cfs for the Canadian River near Whitefield, Oklahoma during the period of 1938 to 1956 (71). The typical shape of at least some portions of all the major rivers of the Southwest is a very wide flat river bed of sand or sandy material with a very narrow channel of surface flow that moves about on the flat bed. A considerable portion of the water of this region is too salty to be used for almost any beneficial purpose. The high temperatures, high wind velocities, and low humidities make the evaporation rate very large. The effects of these factors will be discussed in subsequent sections of this paper.

The river basins of the Southwest have large outcroppings of gypsum and other minerals that dissolve in the surface runoff, as well as in the ground waters. There are large, sub-surface deposits of rock salt that are dissolved by springs that contribute to the flow of several of the rivers in the area. These springs have very salty waters with concentrations that range up to saturation, about 200,000 mg/l.

Because of the foregoing reasons, the rivers of the Southwest are thought to present some unique problems; and, due to the below-average development and population of the region, there is a certain urgency to developing a capability in predicting the probable quality of the water in the rivers of this area so that these predictions may be used in planning improvements on the water quality.

II. PREVIOUS EFFORTS

Man has always needed to be able to predict the quality of water. His livelihood and well-being have depended and do depend upon a sufficient supply of a satisfactory water, and any measure of security that man is able to attain depends upon his being able to rely upon his source of water.

Olden Times

From his beginning man has been forced to the realization of the importance of water in his life; for, while his most pressing need--air--literally envelops him, there are many places with a deficiency of water of a satisfactory quality. In early times he was concerned only with the characteristics of the water that affected its use for drinking. That early man was concerned with a source of drinking water is pointed up by the fact that he lived along streams, and that he was concerned with the quality of the water is exemplified by the early attempts to make the water more palatable. Documented evidence in a Sanskrit document, "Ousruta Sanghita," which has a probable date of 2000 B. C., recommends keeping water in copper vessels, exposing it to sunlight, and filtering it through charcoal (1). For centuries the Chinese have put alum in tubs of water to clarify it (2).

The Romans built a large metropolis where there was a scarcity of water by using their engineering capabilities to bring water by aqueducts. The waters so delivered varied in quality and were classified for use accordingly. There were at least three different classes of water quality, with the first for domestic use, the second for bathing and public use, and the third limited to irrigation and to satisfying the needs of a marine circus for a basin (77).

These early predictions of water quality were usually based on very limited data that ranged from a single observation to the length of the memory of the oldest resident of the area. The prediction was generally

based on less data and cruder data than most of our estimates today and involved fewer variables; namely, man-made wastes and natural wastes redistributed by man in space and/or in time. The streams were, however, subject to the same vagaries of nature then as now--floods and droughts with the accompanying variations in quality.

More Recently

Engineers and others who are responsible for planning water usage have collected the data available on the quality and the quantity of a water source and from these data have predicted the probable future quality and quantity of the supply. More and more statistical interpretation of the available data is being used not only to predict the probable but also to assign a probability to that which is possible but improbable.

The required quality of a water depends upon the intended use; thus, water suitable for papermaking may not anywise be satisfactory for agricultural irrigation (80, 67, 39). The field of water quality has become so complex that a specific prediction of future quality is usually made with a specific use in mind. The suitability of the source for a given industry, for a certain type of agriculture, or for a source of domestic supply is determined with a due account taken of the economics of the supply.

Predictions of the general quality of water are useful in planning for both short-range and long-range water resource use. These predictions are made on those parameters of water quality that affect its use for the most applications, such indices as the concentrations of chlorides, hardness, and total dissolved solids (80, 49).

Long-range planning predictions are needed for effectively regulating pollution, alloting the water, and improving the quality. Pollution control regulations should be made before a severe problem develops to prevent long-term losses while the regulations are being passed and implemented. More and more the political entities are dividing waters of streams and lakes that are common to two or more such political divisions; this allotment of waters depends upon the worth of the water and, therefore, its quality (36).

Long-range water quality improvement programs depend upon valid quality predictions for their success. These improvement programs include reservoir development to store low-mineral flood flows for diluting the highly mineralized low flows, evaporation control to prevent the loss of pure water from a reservoir, and augmentation of the poor quality with a good quality water from another source to obtain a larger amount of usable intermediate quality water (77, 83).

Short-range or immediate planning predictions are needed for actual control of the amount of water to use for augmenting the poor water, allotment of water to suitable purposes, and by-pass control to prevent catchment of inferior waters.

Water re-use is essential to the development of our economy (22). Yet, with each use, the concentration of mineral pollutants increases either by the addition of solutes or by evaporation and, with current technology, this build-up of salinity is the limiting factor in the number of cycles for which the water can be useful (81, 23, 22). Therefore, the most urgent predictions of water quality are those that deal with salinity in general and with chlorides in particular. Durum, Hem, and Ward worked on making these predictions of the dissolved minerals by correlating the mineral quality with the quantity of water (17, 35, 79). The work of these men is more fully discussed later. Gloyna and Schechter (23) used materials balance methods to predict the build-up of chlorides in a reservoir that has recycle of the water. Churchill and his co-workers (14), Krenkel and Orlob (42), and others have used stream characteristics to predict the reaeration rate of waters deficient in dissolved oxygen. The work of these men, though noteworthy, needs extending and refining. This investigation was dedicated to adding worthwhile information on inorganic quality predictions to their work.

III. DESCRIPTION OF THE DATA

The data used for this research consisted of stream flows, specific conductances, various dissolved mineral concentrations, and oil production within a given basin. These statistics of water quantity and quality parameters and other influencing factors were obtained from several different sources. The data were for the Red and Canadian Rivers from the year 1946 to the present.

Types and Sources of Data

The principal data were extracted from the United States Geological Survey (USGS) records for surface water quantity and quality. Many of these data have been published (1, 2); however, the specific conductances for the daily grab samples were taken from the USGS unpublished files in Oklahoma City and are, therefore, included as Appendix A of this report. These specific conductances are shown with the instantaneous flows or daily average flows for the Canadian River near Whitefield, Oklahoma (Station 392) and for the Red River near Gainesville, Texas (Station 508). The instantaneous flow as estimated from the gauge height and a stream-rating curve was used where possible because instantaneous values form a more logical basis for correlation and the emphasis of this investigation was on a correlation of quality with quantity. The principal data were used to run checks on earlier hypotheses, to refine them, and to form new ones.

Secondary data were obtained from records of analyses by the United States Public Health Service (USPHS), the Texas State Department of Health (TDH), and others. These data consisted of some chloride and sulfate concentrations for the Wichita River as run by the USPHS and TDH and contained in the files of the Arkansas-Red River Basins Water Quality Conservation Project (Ark-Red Project) of the USPHS, chlorides concentrations for other rivers in the Ark-Red Basins in published water quality network data (56), oil production data from the records of state

agencies in Texas and Oklahoma, and data from various reference sources to water quality of other regions of this country and of foreign countries. These secondary data were used principally for theorization and estimation purposes and, except for the oil production data which are included as Appendix B, were not the final data used for any of the checks of hypotheses.

The Ark-Red Project has for the past 2 years been engaged in a comprehensive data gathering program on the quality of these two rivers and their tributaries. The data include continuous specific conductivity measurements at about 65 locations where there are also continuous stream-gauging data. It was planned to employ some of these data in this investigation, but the data were not tabulated in time to be used. These data should be available in 1963 for any future investigations of this type.

Some of the stream-gauging stations in this area are operated by the Corps of Engineers and part of the stream-flow data were obtained from their district office in Oklahoma City.

Data for Composite Samples

Most of the developmental work was performed on quality records of composite samples before the aforementioned unpublished data were obtained. Daily grab samples were combined on the basis of similar conductivities and various analyses for pollutants were then run on the composited samples. The proportion of the total sample to be made up of the sample for a particular day was in the same ratio as the flow for that day was to the total flow for the period (61). Each sample was analyzed for specific conductance, sulfates, chlorides, total dissolved solids, hardness, and certain other water quality parameters and represented a period of flow of from one to twelve days. From about 1946, USGS publications have contained a considerable quantity of these data for composite samples. Such data leave much to be desired, but are the best currently available long-term data for the rivers of the Southwest.

The data that were used most heavily from these composite sample records were those for the Red River near Gainesville, Texas (Station 508)

and those for the Canadian River near Whitefield, Oklahoma (Station 392). The data at Station 508 were for Water Years* 1953 and 1955 with 190 samples having been assayed during these two years, 114 and 76, respectively. During the period from the 1947 to 1956 Water Years, inclusive, 1040 samples were run for Station 392.

Data for Instantaneous Samples

The daily values of chloride concentrations and total dissolved solids were generated from the instantaneous specific conductances of the grab samples. This procedure was necessary since these dissolved mineral data are not available on a daily basis for the streams to be studied. The practice of using the specific conductance to estimate various indices of water quality has been a common practice for a considerable time (35, 6, 76). For a given stream, there is almost a constant, straight-line relationship between the specific conductivity and several parameters of water quality, including the concentration of chlorides, total dissolved solids, hardness, and others dependent upon dissolved minerals (see Figures 1, 2, 3, and 4). Some investigators have found such a connection between the sulfate concentration and the specific conductance (17). However, the data available for use on this project did not show this tie (see Figure 5).

The figures relating the various water quality indices with specific conductances, Figures 1, 2, 3, 4, and 5, are plots of only 120 points that were selected from the 1040 pieces of composite data for Station 392. These points were selected by taking the sample with the high flow value for one month, the sample with the low flow value for the next month, and the centrally located sample by position in the chronological tabulation for the next month, and repeating this pattern for a year. This pattern was selected to give several points in all ranges of the curve with as little bias as could easily be achieved. The next year a different permutation of the order of the same three selection modes was used. This pattern was repeated until one value for each month of the 10 years had been selected.

*A water year runs from October 1 through September 30.

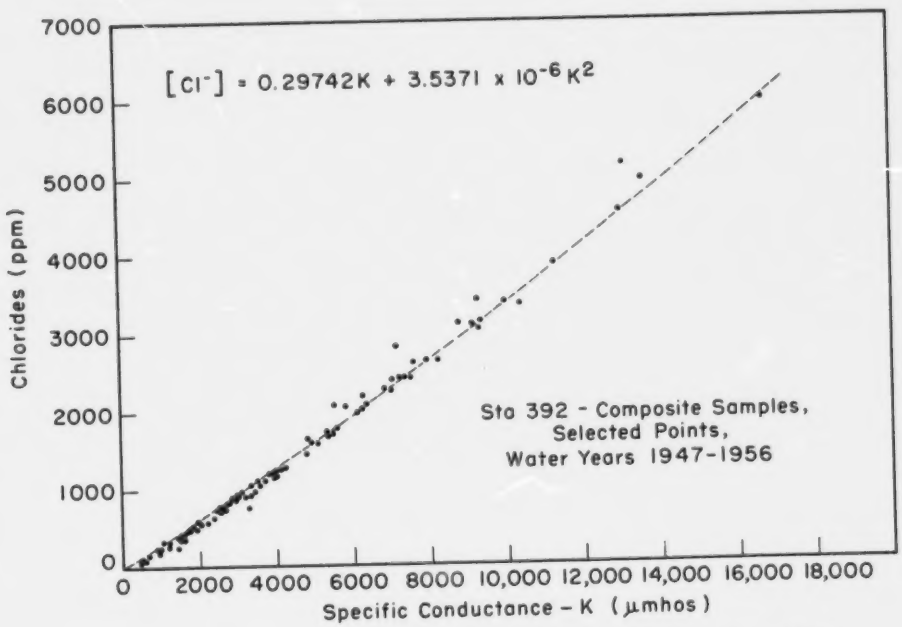

FIG. 1. CHLORIDES VS. SPECIFIC CONDUCTANCE.

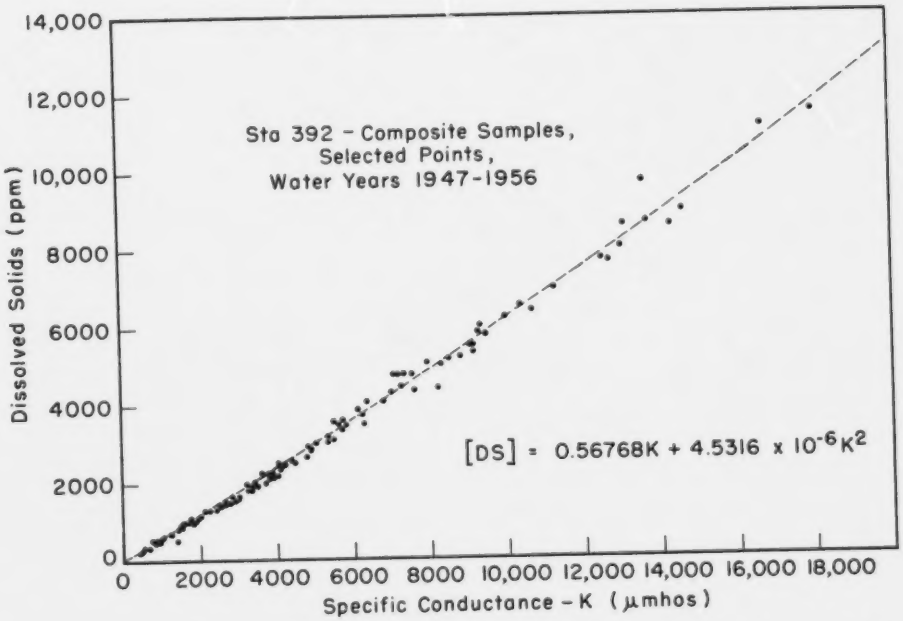

FIG. 2. DISSOLVED SOLIDS VS. SPECIFIC CONDUCTANCE.

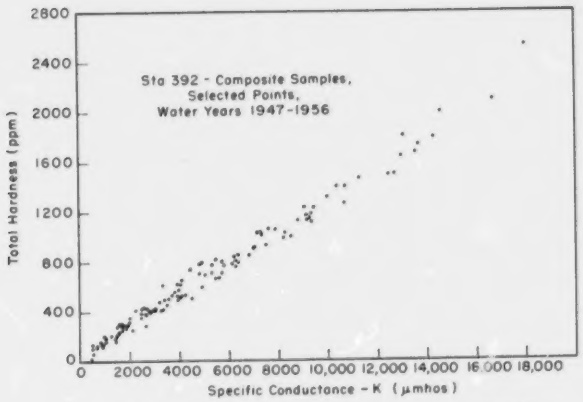

FIG. 3. HARDNESS VS. SPECIFIC CONDUCTANCE.

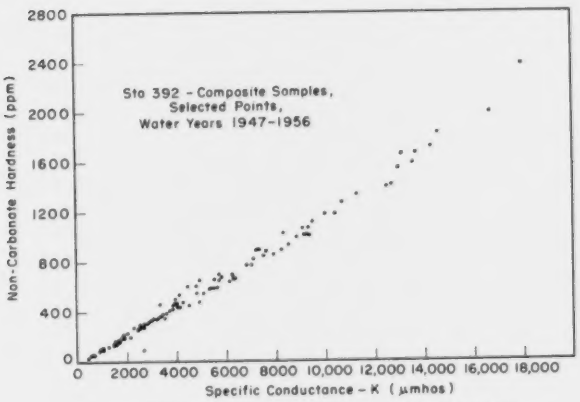

FIG. 4. NON-CARBONATE HARDNESS VS. SPECIFIC CONDUCTANCE.

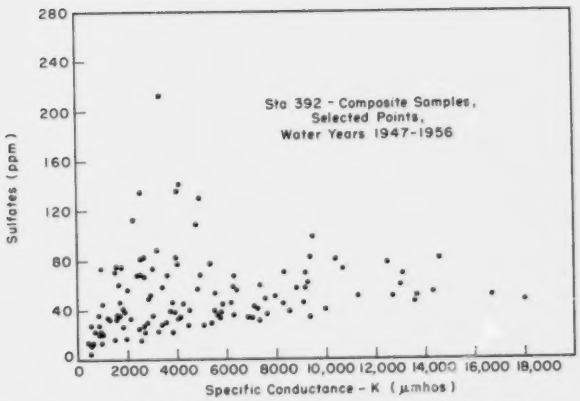

FIG. 5. SULFATES VS. SPECIFIC CONDUCTANCE.

The same 120 selected sample data were used to fit by least squares a second degree parabolic regression of the chlorides concentration on specific conductance and of the dissolved solids concentration on specific conductance. The 190 composite samples for Water Years 1953 and 1955 were used for determining the regression parameters for Station 508. In order to avoid negative concentrations of chlorides and dissolved solids for low specific conductances without resorting to more than one calculating equation, these regressions were forced to pass through the origin by omitting the constant term usually used in curve-fitting polynomials. Perhaps a cubical parabola without a constant term should have been used to get a better fit in the low-range of the curve. The constants of fit thus determined were then used to calculate the chlorides concentration and the dissolved solids concentration for each of the daily specific conductances by the use of Equation 1.

(1) $y = a K + b K^2$, where y = the concentration of dissolved mineral (ppm),

K = the specific conductance (μmhos),

and a and b = regression coefficients (ppm/μmho and ppm/$[\mu\text{mho}]^2$, respectively).

Sta. 392--Chlorides:	a = 0.297418 and b = 3.53714×10^{-6}
Dissolved Solids:	a = 0.567680 and b = 4.53162×10^{-6}
Sta. 508--Chlorides:	a = 0.220053 and b = 5.57792×10^{-6}
Dissolved Solids:	a = 0.603571 and b = 3.13766×10^{-6}

The instantaneous data for Station 508 are not daily; some days were skipped and others have two values. These concentrations were, in turn, used to calculate the amounts of chlorides and dissolved solids in tons per day based on the assumption that the specific conductance and flow values tabulated persisted throughout the day. Calculated data were usually punched out on cards by the output unit of the computer.

This same procedure could also be used to generate data for other quality parameters, such as the concentrations of total hardness, noncarbonate hardness, alkalinity, and others that correlate closely with the specific conductance, as illustrated previously.

Estimated Data

The daily grab samples for several days were missing and, in the interest of completeness, the specific conductances for these days were estimated. These estimates were made by finding a day with approximately the same flow and same immediate history of flow as those for the missing sample and assuming that a like specific conductance would prevail.

Instantaneous flows at the time of taking the daily samples were estimated from gauge heights and stream-rating curves when such information was available. These estimated flows were felt to be more appropriate than the daily average flows for the correlation of quality with quantity, as previously mentioned.

Accuracy of the Data

The overall accuracy of the data should be good, though there are probably a few rather large errors in these data. Errors tend to be present in almost any long tabulation of statistics; but insofar as is possible, precautions have been taken in an effort to prevent such errors. The original data of flows and specific conductances were put on IBM punch cards which were then proofed by verification. These data along with the data generated from them were then punched into a deck of cards by the computer output. The cards were listed by machine and photographic reproductions of these lists were used for Appendix A.

The stream flow data were obtained in most instances by using a gauge height and referring to a stream-rating curve. The stream-rating curves are periodically renewed by new stream velocity and cross-section measurements. These data are for stations described as "good" by the USGS and should, therefore, have less than 10 per cent error in them (71). However, the instantaneous flows estimated for Station 392 were made by personnel inexperienced in the sampling area and may well contain some gross errors; but, these possible inaccuracies may be present in almost any investigation requiring massive amounts of analytical data.

The concentrations of the dissolved minerals were determined in

accordance with the accepted practice at the time of analysis (70). The test used for the chlorides content has a precision of 0.1 mg of chloride with the accuracy limited by end-point judgment and interference. Dissolved solids can be determined rather closely with relative ease and minor equipment. This test was made simply by evaporating the filtrate of the sample and weighing the residue. For waters containing moderately large amounts of dissolved salts, the dissolved solids were estimated from the sum of the concentrations run for the various dissolved minerals.

Other major errors in the data may be due to a failure to correct for temperature in the temperature-dependent conductivity measurements, to the subjectivity of the end-point of the chlorides test, to a change in the method of reporting the specific conductances, and to the sub-surface flow of the river. The specific conductance varies approximately 2 per cent per degree centigrade (70). A considerable discrepancy is likely to occur between the chlorides determinations made by different people because the end-point of the titration is a subtle color change. The specific conductance at the start of the period of the data was reported in reciprocal ohms (mhos) times 10^{-5}. During the period of the data the units of the specific conductances were changed to micromhos (μmhos) or mhos times 10^{-6}. The sub-surface flow in rivers of the Southwest is the major portion, and sometimes all, of the low flows.

These comments on the probable accuracy of the data are offered not to discredit the data but rather to illustrate probable discrepancies in individual pieces of the data.

IV. CORRELATIONS

The correlations made in this study were made for the purpose of formulating predictions of water quality. These correlations were generally made by reference to a graph of variables rather than to a correlation coefficient; however, a computer program was written to calculate the linear coefficients between two variates, between combinations of the variates and their logarithms, and between their logarithms. This program would tell which kind of graph paper to use in plotting the variates for using a straight-line relationship between them. Multiple regression of three variates was also programed for the computer.

Correlations that were tried on small sets of variates were calculated by Kendall's rank correlation method (40). This method gives a measure of the number of permutations among one of the variables when the variate is ordered so that the corresponding values of the other variable are arranged in increasing or decreasing order.

A variation of the method of averages was used to run the preliminary correlations of the data. The data were sorted by size of one of the variables and divided into groups whose bounds were roughly logarithmically graded; then the average of the sorted variate and the corresponding correlating variable within each band was determined. These so-called banded averages were then plotted to give some indication of the relation between the variates in the raw data. The spacing of the bounds was 1, 2, 5, 10, 20, 50, 100, etc. This technique was programed for the LGP-30 computer early in this study. An example of the results of such a technique may be seen in Figure 6.

Quality with Quantity

The fact that the quality of a surface stream varies with its quantity of flow has been common knowledge for a long time (see Figures 7, 8, 9, 10, and 11). The formulation of this relationship has been tried several times with varying degrees of success. It is important to know a workable

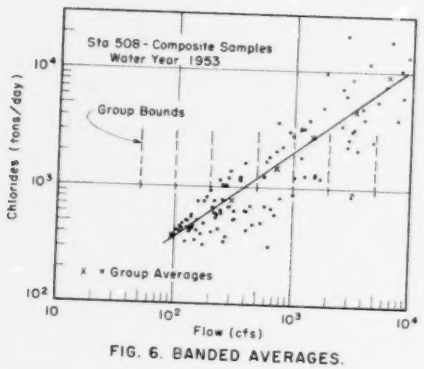

FIG. 6. BANDED AVERAGES.

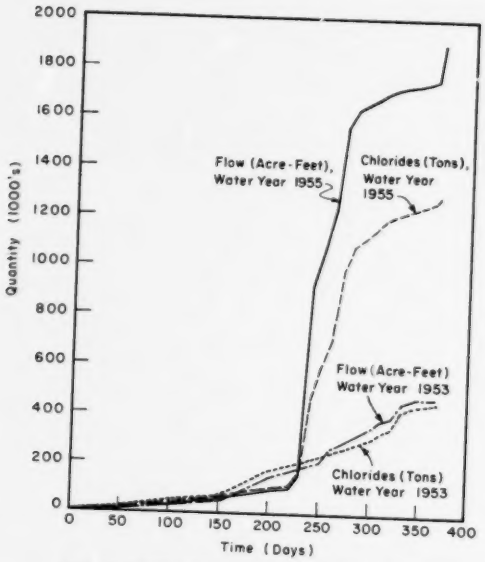

FIG. 7. CUMULATIVE CHLORIDES AND FLOWS.

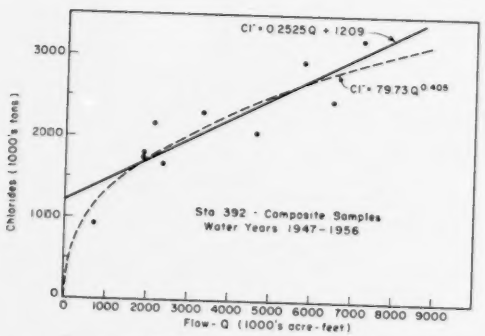

FIG. 8. CHLORIDES VS. FLOWS FOR YEARLY TOTALS.

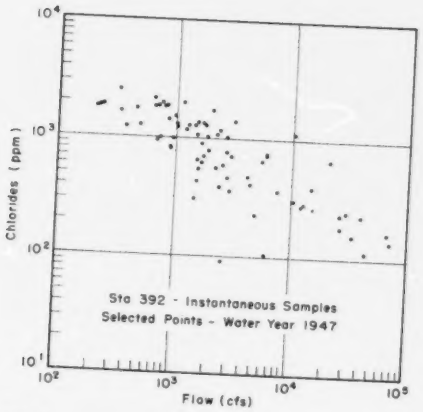

FIG. 9. CHLORIDES CONCENTRATION VS. FLOW.

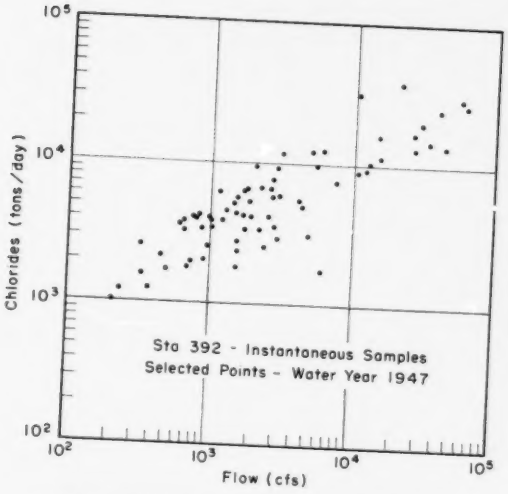

FIG. 10. QUANTITY OF CHLORIDES VS. FLOW.

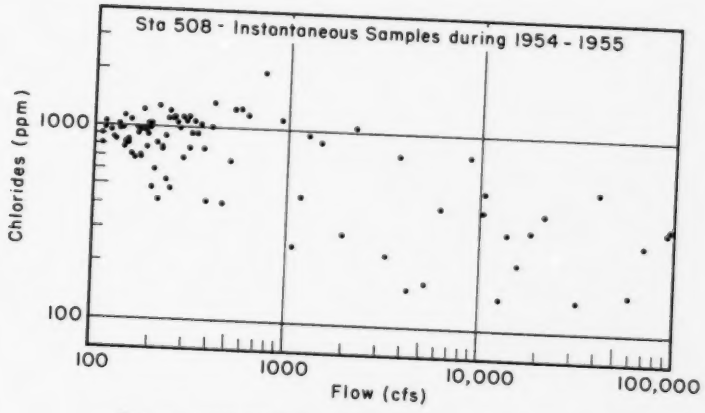

FIG. 11. CHLORIDES CONCENTRATION VS. FLOW.

method for predicting the water quality at different stages of flow for purposes of quality improvement by dilution with stored water, catchment of the better waters for storage, estimation of yields of various qualities, and determination of the economic effects of changing the quality of the water.

Durum (17) worked with data for the Saline River in Kansas and found that a simple hyperbolic relationship gave a fair approximation for estimating chloride concentration from a given flow. Lenz and Sawyer (45) reversed the usual process and used the alkalinity versus the stream flow curves for estimating the flow from a measured alkalinity.

Ward (79) used monthly weighted averages of composited sample data for the Arkansas River near Tulsa, Oklahoma and the Red River near Gainesville, Texas. From this work he concluded that the best estimate of the concentration of the dissolved mineral could be had from a parabolic relationship between the logarithms of the concentration and the stream discharge and that a good estimate could be made from a simple logarithmic relationship between the concentration and the stream flow. The latter is shown here as Equation 2 and is recommended only for a very rough correlation.

The scatter diagrams of stream discharge versus mineral concentration when plotted on logarithmic graph paper indicated that an equation of the form

$$(2) \quad c = K Q^{b}, \quad \text{where } Q = \text{the stream discharge,}$$

c = the mineral concentration, and

K and b = regression parameters,

could be used for estimating quality for a given quantity. As may be noted in Figures 9, 10, and 11, there is not a single-valued relationship between dissolved mineral concentration or content and flow. There are many other variables besides quantity of flow involved in determining the concentration of the pollutant and they are being ignored when K and b in Equation 2 are considered constant. However, for a first estimate, and at times the only estimate, the parameters K and b may be considered as

constant for a given location on a specific stream. This estimate amounts to the use of a straight line to represent the regression of c on Q in Figures 9, 10, and 11. The line may be fitted by eye, by the method of averages, or by the method of least squares as was usually done in this work.

A considerable improvement in the estimate of water quality may be made by considering b a variable instead of a constant. The parameter b appears to vary logarithmically with the stream flow (see Figures 12 and 13); therefore, the following equation can be used to estimate b.

(3) $b = p\,Q^{n}$, where b = the exponent for Equation 2,
Q = the stream flow, and
p and n = regression coefficients.

The use of Equations 3 and 2 will give a rather good estimate of the mineral concentration for a given flow at Station 508 and a fair estimate at Station 392. If there are insufficient data for refining this estimate, it may be used as the final prediction of quality for a given quantity.

Reference to Figures 12 and 13 will show that for a given value of flow, a band of values for b is possible. This lack of a single-valued tie between the logarithms of b and the flow points once again to the influence of the ignored variables that were mentioned above. A partial accounting of these variables could be made by introducing a term that expresses the immediate past history of flow for the location in question. Such a historical term was defined as an antecedent flow index to be represented by

(4) $Aq_k = \sum_{i=1}^{30} \frac{Q_i}{i}$, where Aq = the antecedent flow index,
Q = the stream flow, and
i = the number of days back from the kth day.

There is considerable precedent for this type of factor, which is known as the Zipf distribution, since an antecedent precipitation index has been used in hydrology. Also, a harmonic series of this form has been applied to explain the frequency of word usage in the field of psychology and has been

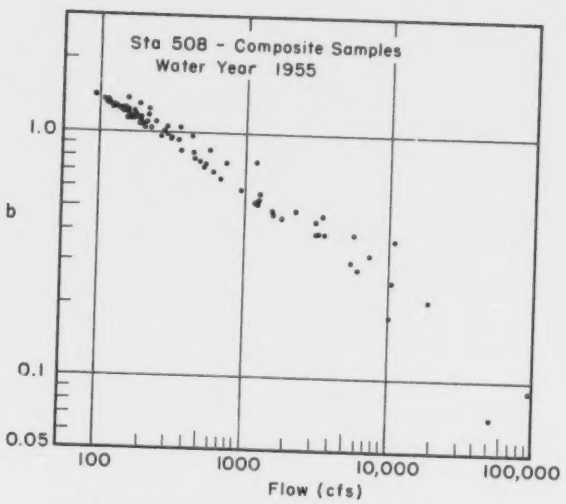

FIG. 12. PARAMETER b VS. FLOW.

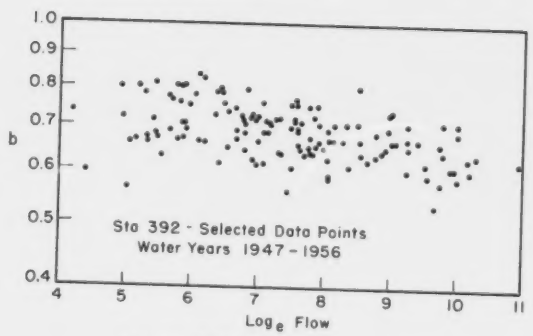

FIG. 13. PARAMETER b VS. FLOW.

applied in the fields of political science and others (46, 84).

The scatter diagram of b versus Aq on semi-logarithmic graph paper (see Figures 14 and 15) shows that the effect of the antecedent flow index may be accounted for by using a straight line on this plot or including a logarithm of Aq term in an expression for b. The expression for b then becomes

(5) $b = f + g \log Aq + h Q^n$, where Q = the stream flow,
Aq = the antecedent flow index,
n = the slope of the log b on log Q regression,
f, g, and h = regression constants, and
b = the exponent for use in Equation 2.

This equation represents about the maximum degree of complication that is believed desirable in equations for predicting quality from quantity.

Other historical terms were tried and some gave a fair measure of accounting for such changes. The factors that showed the most promise were the total flow in a period of a week or a month and the per cent change in flow with attention to the direction of this change. For the data used here, the antecedent flow index was superior; however, some other historical factor might prove more applicable elsewhere.

Quality with Oil Production

When this work was undertaken, the investigator expected that a strong correlation would exist between oil production and the quantity of chlorides for the basin. It was decided to determine what portion of the chlorides in the stream could be attributed to the production of oil. By using the slope of the regression curve between the quantity of chlorides and oil production, one should be able to distinguish the portion of chlorides furnished by oil production as represented by the constant in the linear curve fit from those of other sources.

Much difficulty was experienced in determining the oil production for the Canadian River Basin above Whitefield, Oklahoma (see Appendix B).

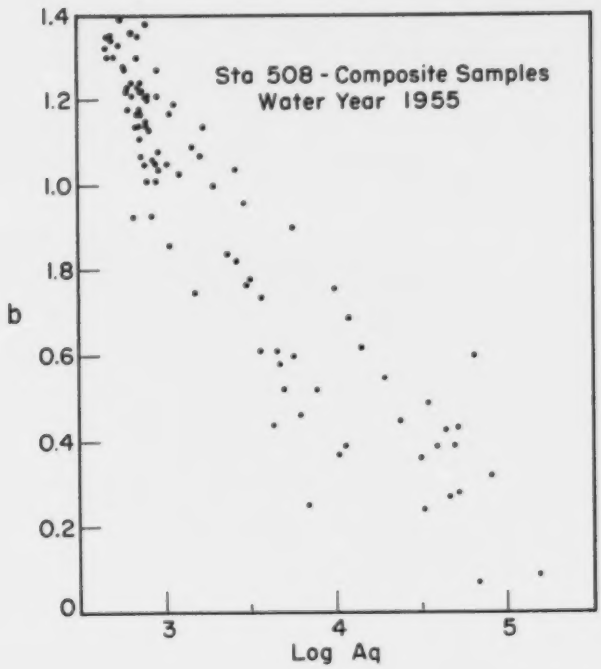

FIG. 14. PARAMETER b VS. ANTECEDENT FLOW INDEX.

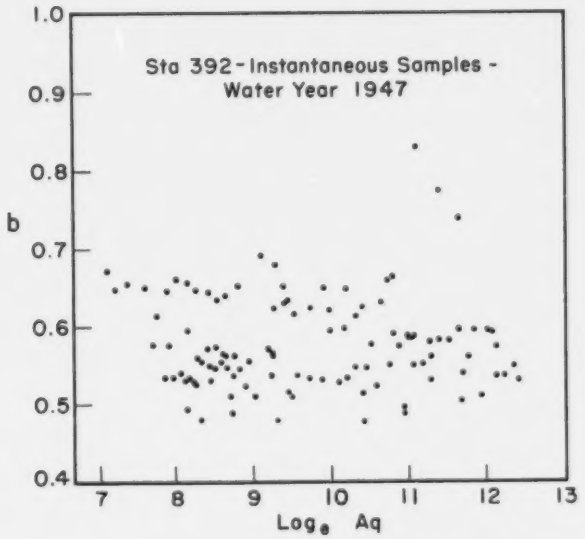

FIG. 15. PARAMETER b VS. ANTECEDENT FLOW INDEX.

A rank correlation according to the methods of Kendall (40) was run between the yearly oil production and the total chlorides. The coefficient obtained was -0.69, which would indicate a fairly good negative correlation. Obviously such a correlation could not exist; therefore, efforts were made to rectify this error. The flow varied rather widely for the 10 years of record (Water Years 1947 to 1956); hence, it was decided to remove the effects of the flow variation upon the total chlorides by the scheme described above, assuming the constant factor from the linear curve fit shown in Figure 8 to represent the effect of flow upon quantity of chlorides. This operation was performed and the adjusted data gave a rank correlation of -0.16, which indicated no practical correlation.

Efforts were then shifted to a smaller basin with more extensive oil developments. The Wichita River at Wichita Falls, Texas (Station 503) was selected because data for a period of 16 months were available and there are extensive oil fields in the basin. The rank correlation was run between monthly totals of chlorides and oil produced (see Appendix B). The coefficient linking these quantities was 0.11, which would indicate no significant correlation. The Wichita River has a rather large reservoir, Lake Kemp, that regulates the flow and would introduce a lag into the time of the appearance of the chlorides downstream from the reservoir. This lag would vary with the rate of flow in the river and other factors. A cursory glance at the data prompted a trial of correlating with a 2-month lag period. This technique increased the coefficient from the previous 0.11 to 0.26 (see Figure 16).

These attempts at correlating the production of oil with the quantity of chlorides, while not giving an answer, did indicate some points of note. Although there is certainly a tie between oil production and the chloride content of the rivers, the methods used here failed to give an adequate indication of this connection because the considerations were limited to too few of the variables involved, the oil production did not vary widely, and the data lacked precision. The work on the Wichita River Basin was of necessity done on monthly totals, which could give rise to variations

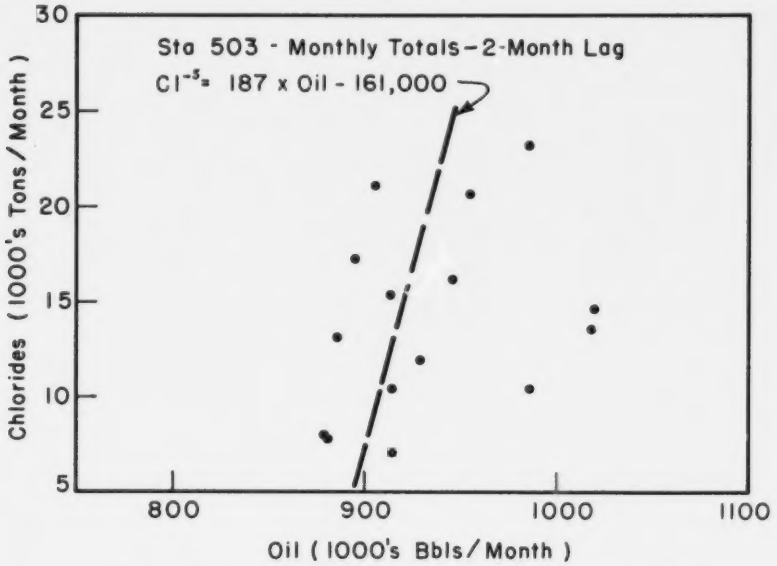

FIG. 16. CHLORIDES VS. OIL PRODUCTION.

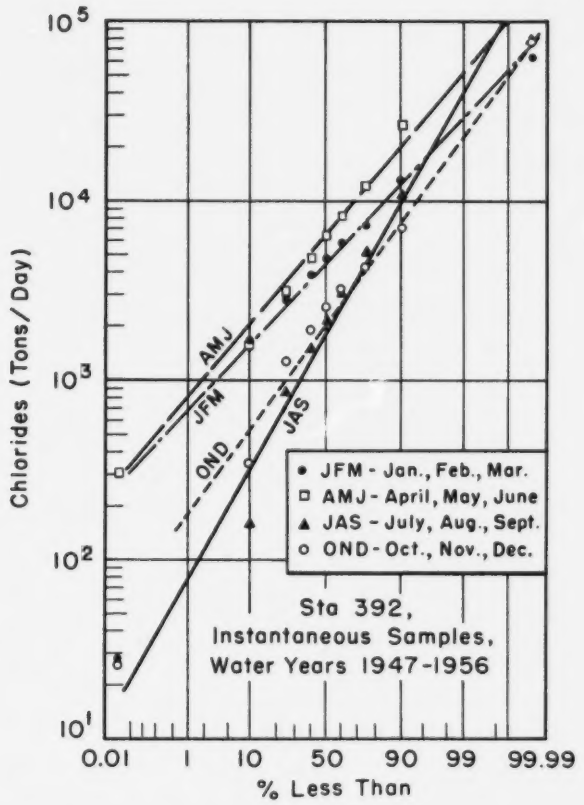

FIG. 17. SEASONAL CHLORIDES FREQUENCY.

in the data due to the storage and release times from the brine pits of the oil producers and to the variable storage time in Lake Kemp. It is unlikely that the chlorides from oil production are a large fraction of the total prevailing chlorides in the rivers studied; probably, the natural chlorides are at least several times the oil field brines that occur in these rivers. Further discussion of oil field brines will be found in Chapter VI, Further Considerations.

Secular Trends

The data showed the expected seasonal variations among variables that are linked to the rainfall. Using the medial values for an index, the flows arranged in decreasing order would occur in the spring, winter, summer, and fall (see Table 1). The chlorides and dissolved solids would vary only in the interchange of the summer and fall values, which are close together in magnitude anyway (see Figure 17).

TABLE 1

SECULAR TRENDS

Sta. 392--Daily Data--Water Years '47-'56

Item	Period	Minimum	1st Quartile	2nd Quartile	3rd Quartile	Maximum
Flow (cfs)	JFM	123	430	1160	2940	45,400
	AMJ	106	1110	3300	10,600	218,000
	JAS	1.8	195	787	2940	122,000
	OND	13	228	516	1320	128,000
Chlorides (tons/day)	JFM	27	2770	4620	7110	60,600
	AMJ	304	3110	6330	12,000	136,000
	JAS	3.9	855	2140	5050	83,500
	OND	26	1250	2500	4180	77,500
Dissolved Solids (tons/day)	JFM	52	5290	8810	13,600	116,000
	AMJ	580	5930	12,100	23,000	259,000
	JAS	7.5	1630	4090	9640	159,000
	OND	50	2390	4760	7970	148,000

The data were too short-term to indicate any long-term trend. Rank correlations with time were run on the various average values, and despite rather strong correlations of 0.78 and 0.82 that were found for the yearly average concentrations of chlorides and dissolved solids, there is probably no significance to the increases shown by these correlations because there was a correlation of -0.73 for the yearly average flows with time over the same period. Flows correlated with the concentration of chlorides gave a coefficient of -0.60.

V. FREQUENCY ANALYSES

The data used in this work do not conform to any commonly used frequency distribution. The Pearson skewness of the data was in every case positive and ranged from a slight amount to very strong. The strongly skewed distributions were in the majority. Skewness as a statistical parameter has various definitions; the skewnesses calculated herein were those of Pearson or Bailey and of Bowley (19, 59). The usual statistical parameters including these skewnesses were run for most of the data and may be found in Appendix C, along with the definitions of the various parameters. The skewnesses ranged from 0.35 to 12.35 for Pearson skewness and from -0.23 to 0.69 for the Bowley skewness, B_s (where $B_s \leq 1$).

Order Statistics

A major effort was made in an attempt to find a single frequency function that would fit the frequency curves for the flows and the various concentrations of minerals for the composited and the instantaneous samples. This effort included working with the normal frequency function and its graphs through the logarithmic and other usual transforms and with several special skew frequency curves and transforms. The best frequency fits were obtained with the modified Cauchy curves.

The extremes of the quality and the quantity data were treated separately by Gumbel's methods. This work was limited by the lack of long-term quality data.

The order statistics were run by sorting the data according to size on the card sorter, listing the data, and counting the number of pieces of data in any given size limits. This procedure could be programed for the computer, but it was felt that less overall time would be consumed on the sorter and there was an advantage in seeing how the other variates behaved when the cards were ordered on one particular variable. Also, by using this procedure, the grouping limits could be selected more easily and could be readily changed.

The frequency data were plotted on logarithmic-normal probability paper and in a few instances on normal probability paper. These plots were made more for their contribution to the information about the variation of the data than for the possibility that straight lines would be obtained. Only in the case of the sulfates concentration was a good approximation to the logarithmic-normal distribution obtained (see Figure 18). Other plots are included as Figures 19, 20, and 21 in order to show how the data deviate from the normal and the logarithmic-normal. Modifications and transformations of the logarithmic-normal are discussed later under the works of Slade and Brakensiek.

Many people have devised special skew frequency functions, and several of these functions were tried for their applicability to the data used in this report. These schemes involve either a special graph paper for obtaining a straight line frequency plot or an algebraic transformation that will cause the data to belong to a type of distribution that is more familiar or both of these techniques.

Goodrich (25) worked out a series of transformations that were designed to make all frequency curves into straight lines. Toward this end, he devised a special skew frequency probability paper. This paper uses the log scale for the size and a colog scale for the frequency of per cent less than. The transform did not work for at least one case which had an indicated subtraction of a constant quantity. The constant to be subtracted was found by trial and error and the quantity needed for the major portion of the curve exceeded the minimum observed value. Obviously, a transform that gives negative values for a size measurement is undesirable and could not, in any case, be plotted on a log scale.

A computer program was written for a method devised by Slade (68). This frequency distribution is a modification of the log-normal of the form

$$(6) \quad y = a \exp\left[-c^2 \left(\log d\{x + b\}\right)^2\right],$$

where b = the maximum lower deviation of the statistics from their mean and

a, c, and d = parameters of fit for the frequency function.

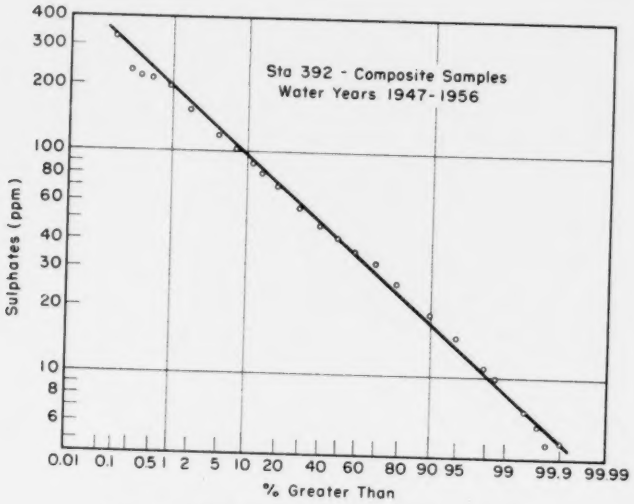

FIG. 18. FREQUENCY PLOT FOR SULFATES.

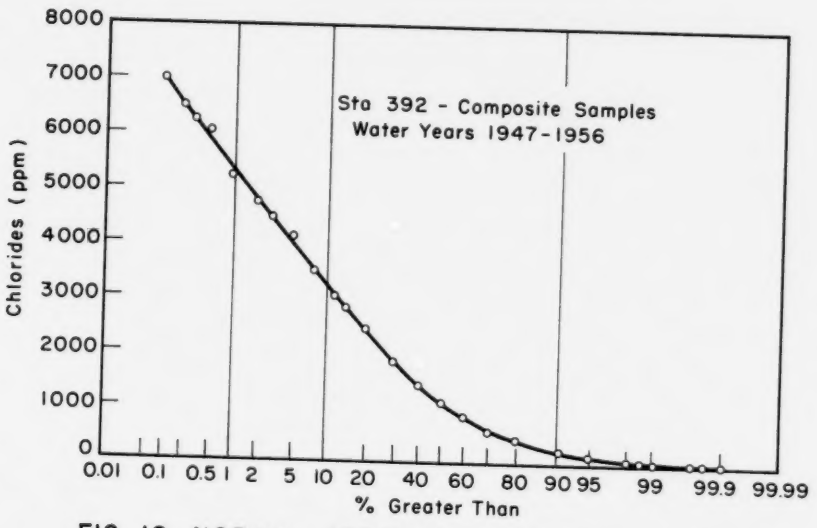

FIG. 19. NORMAL FREQUENCY PLOT FOR CHLORIDES.

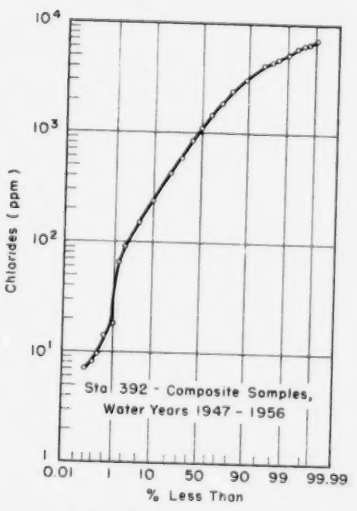

FIG. 20. FREQUENCY PLOT FOR CHLORIDES.

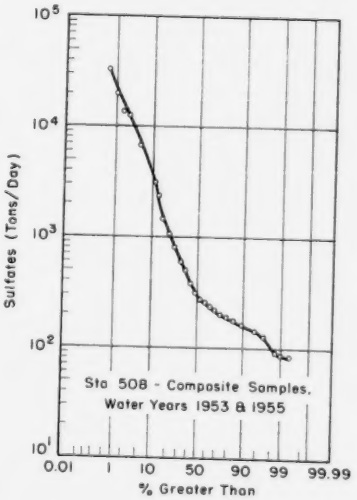

FIG. 21. FREQUENCY PLOT FOR SULFATES.

The partly bounded function, as Slade called Equation 6, did not fit the frequency curves involved here with sufficient accuracy in the range of most interest (see Figures 22 and 23).

Another program written in an attempt to find a satisfactory frequency relationship was for calculating some of the parameters needed to fit a generalized log-normal distribution after Brakensiek (7). According to this generalization, a transform of the data may be made by using

$$(7) \quad U/\bar{U} = k\,(x/\bar{x}) + (1 - k),$$

where U = the transformed variate,

$\bar{U}$ = the mean of the transformed variate,

x = the observed variate,

$\bar{x}$ = the mean of the observed variate, and

k = the ratio of the coefficients of variation for the transformed and observed variates.

There is a certain disconnected feeling in dealing with data that have been transformed by adding to or subtracting from each entry. This is a much stronger objection on the part of this investigator than the use of scale factors that are multiplied by each entry. The Brakensiek transformation has, in addition to such a disconnection, a drawback in trying to fit those frequency distributions that give S-shaped, ogee, or compound curves when plotted on log-normal probability paper.

In an effort to obtain a single formulation that would satisfactorily fit all the frequency curves used, some of the Pearson family of curves were tried (19). The Types I, III, and VI showed some promise; however, these curves went into the J-shape too soon when the skewness was very strong and did not give a very good fit in the rapidly curving tailing-out portion of the frequency curves.

Gumbel's second asymptotic distribution (28) was tried and modified to give a better representation of the curves. The formulation used was

$$(8) \quad y = c \left(\frac{v}{z + a}\right)^{k+1} \exp\left[\left(-\frac{v}{z + a}\right)^{k}\right],$$

where y = the probability density, z = the variate studied, and v, a, c, and k = parameters of fit.

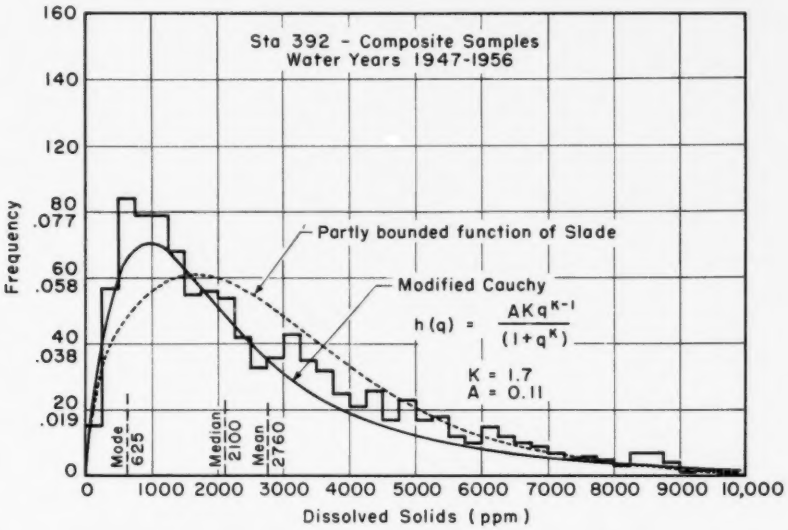

FIG. 22. DISSOLVED SOLIDS FREQUENCY.

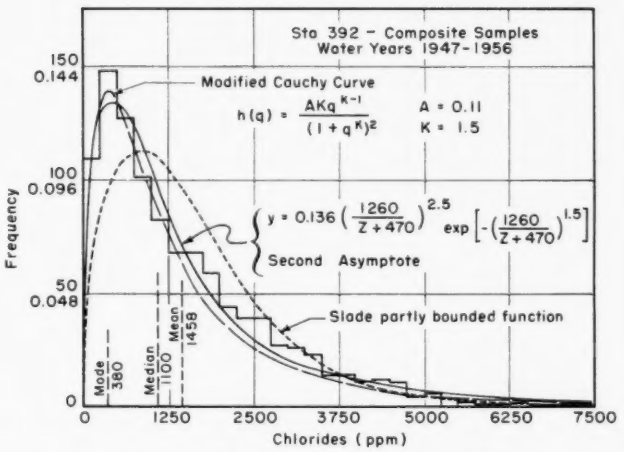

FIG. 23. CHLORIDES FREQUENCY.

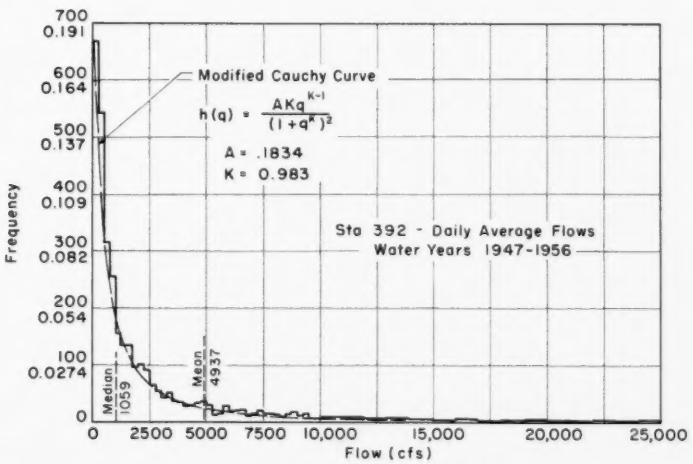

FIG. 24. FLOW FREQUENCY.

This formulation gave rather good fits to the frequency curves (see Figure 23), but it was very tedious to use and the variate is so transformed that it is difficult, if not impossible, to understand any connection with the original variate.

A family of curves known as a modified Cauchy distribution was the most successful single-formula set of curves tried (28). The formulation used for these curve fits was

$$(9)\quad h(q) = \frac{A\,k\,q^{k-1}}{(1+q^{k})^{2}},$$

where $h(q)$ = the probability density,
A = the vertical scale factor,
k = parameter of fit, and
q = the transformed variate (x/x_{median}).

Equation 9 as shown has a significant change from the referenced formula; namely, the inclusion of a vertical scale factor, A, which equals one for the referenced Pareto type distribution function. The parameter k in this formulation was estimated in a computer program by

$$(10)\quad k \doteq \frac{\pi}{\sqrt{3}\,\sigma_{\lg q}},$$

where k = parameter of fit for above,
$\sigma_{\lg q}$ = the standard deviation of the natural logarithms of q, and

$$\pi \doteq 3.14159.$$

When a computer is not used or when a check on the estimate by the above formula is desired, the k may be easily calculated if the frequency function has a mode by the use of

$$(11)\quad \tilde{q}^{k} = \frac{k-1}{k+1},$$

where $\tilde{q}$ = the modal value of q.

The modified Cauchy has disadvantages in the type of transform and in the lack of the usual statistical moments and parameters; however, it gave the best fits, within the useful range, to the data used here (see Figures 22, 23, and 24).

Extremal Statistics

The prediction of extreme values is often the most important part of water quality studies. Here again the chlorides are a multi-valued function

of the flow (see Figure 25). For the estimation of how much water of a quality better than certain criteria is available, it is necessary to study flows since they give minimum mineralization values. Conversely, if it is desirable to estimate how much of the time a quality worse than given standards persists, one must work with the drought flows.

Several hydrologists have proposed methods of estimating flood flows from frequency concepts. Probably the most widely used methods are the asymptotic distributions of Gumbel (28).

The exponential type distribution is fitted by the first asymptote, which has a probability function of

$$(12) \quad P(y) = \exp [- \exp (-y)] .$$

The first asymptote was used to fit the minimum and maximum flows (see Figures 26 and 27).

The second asymptote is used for the Cauchy or Pareto types of distributions and has a probability of

$$(13) \quad P(y) = \exp \left[-\left(\frac{s - y}{v_n - s} \right)^{-k} \right] .$$

This type of function was used to fit the skewed frequency curves (see Special Skew Distributions) but was not used in analyzing the extremes.

The third asymptote is used to fit those maxima that are bounded on the high side and the minima that may go to a lower limit. The probability is described by

$$(14) \quad P(y) = \exp \left[-\left(\frac{w - y}{w + v_n} \right)^{k} \right] .$$

The third asymptote was used to fit the minimum concentrations of chlorides (see Figure 28) because it gave a better fit than the first or second asymptotes rather than because there was a likelihood that the concentration of chlorides could go to zero.

A most interesting relationship that may be used to predict flood frequencies is that flood flows, those above some basic stage, will plot a straight line against the logarithms of their return periods (see Figure 29). This phenomenon was first described as an interpretation of a theorem of

Gumbel by Chow (10) and was used by others on an empirical basis with good results (28).

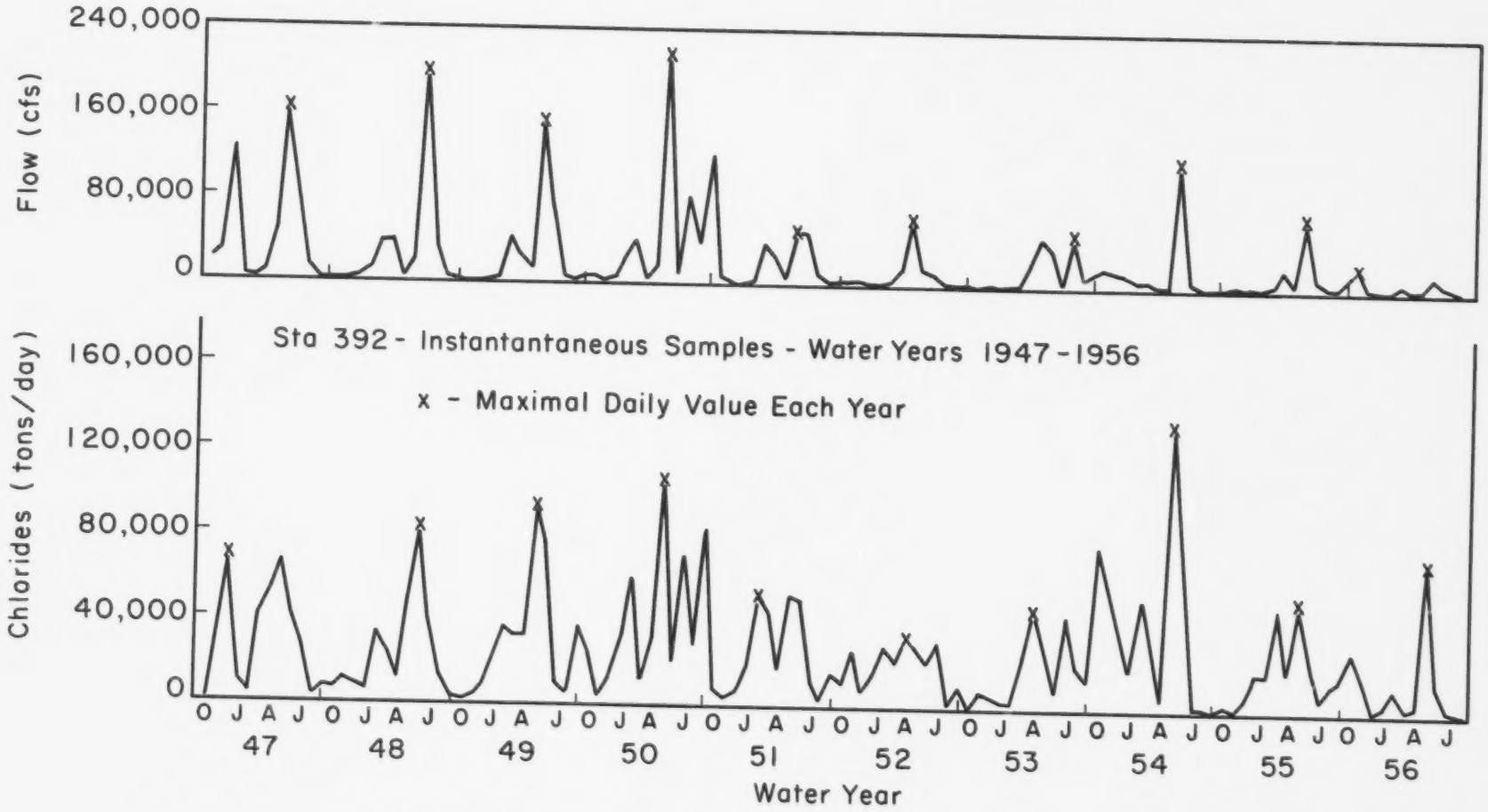

FIG. 25. DAILY MAXIMA EACH MONTH FOR FLOWS AND CHLORIDES.

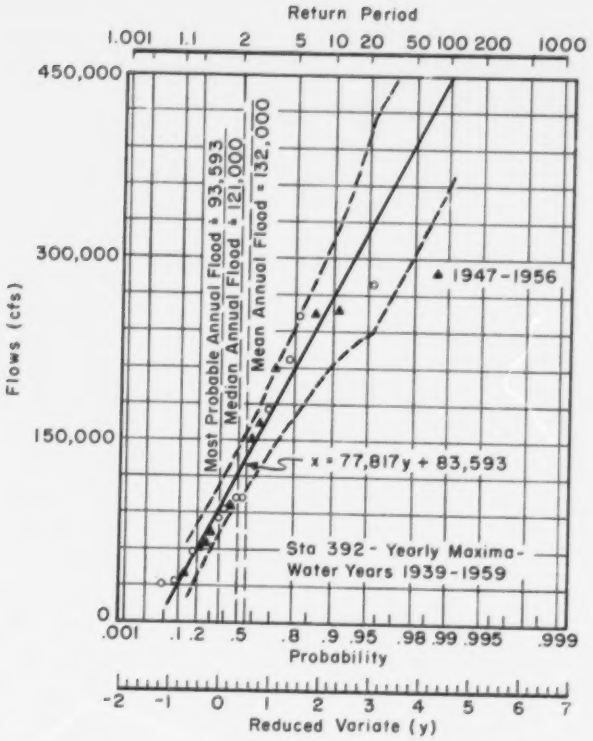
Return Period
1.001 1.1 2 5 10 20 50 100 200 1000
450,000
300,000
150,000
0
Flows (cfs)
Most Probable Annual Flood = 93,593
Median Annual Flood = 121,000
Mean Annual Flood = 132,000
▲ 1947-1956
x = 77,817y + 83,593
Sta 392 - Yearly Maxima -
Water Years 1939-1959
.001 .1 .2 .5 .8 .9 .95 .98 .99 .995 .999
Probability
-2 -1 0 1 2 3 4 5 6 7
Reduced Variate (y)

FIG. 26. MAXIMUM FLOWS.

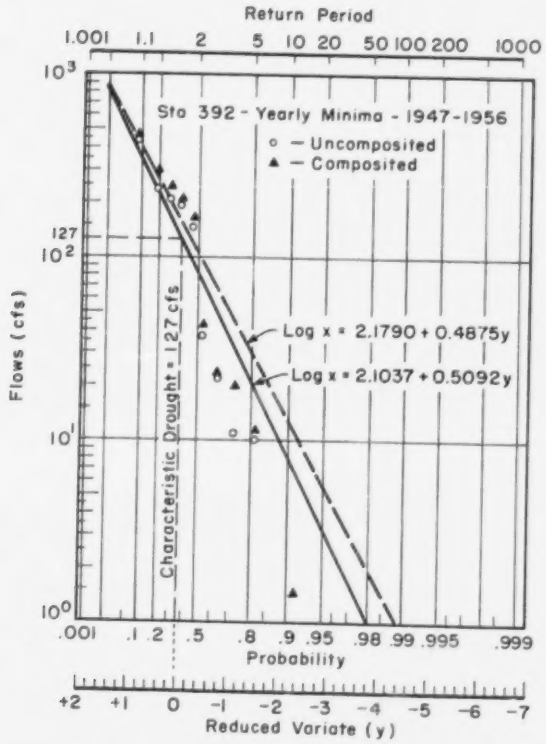
Return Period
1.001 1.1 2 5 10 20 50 100 200 1000
10³
127
10²
10¹
10⁰
Flows (cfs)
Sta 392 - Yearly Minima - 1947-1956
o — Uncomposited
▲ — Composited
Log x = 2.1790 + 0.4875y
Log x = 2.1037 + 0.5092y
Characteristic Drought = 127 cfs
.001 .1 .2 .5 .8 .9 .95 .98 .99 .995 .999
Probability
+2 +1 0 -1 -2 -3 -4 -5 -6 -7
Reduced Variate (y)

FIG. 27. MINIMUM FLOWS.

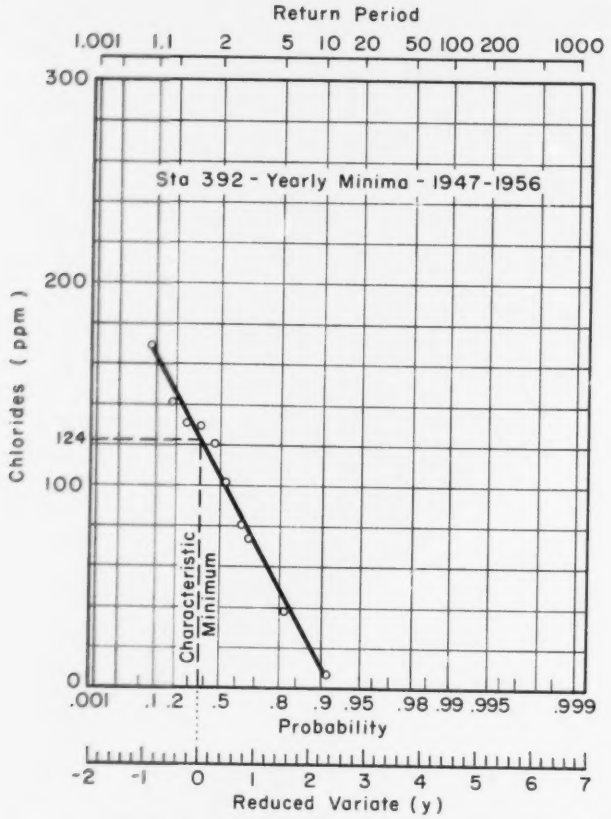

FIG. 28. MINIMUM CHLORIDES.

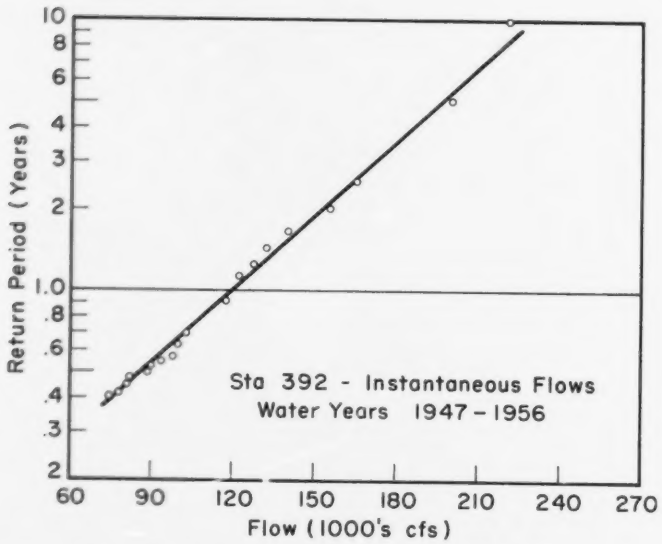

FIG. 29. FLOOD FLOW FREQUENCY.

VI. FUTURE CONSIDERATIONS

The technique of making a materials balance, which represents the ultimate study in water quality, finds wide application in engineering. The use of this method usually requires, and will require here, the making of some assumptions. The discussion herein is limited to a description of the techniques without support of substantiating data. This is done because any real accounting of quantities by the running of materials balances would require continuously measured data which are not now available. The aforementioned Ark-Red Project has made continuous recording of the flow and the conductivity and will make these data available in the near future.

The chlorides in the Red and Arkansas Rivers may be classified into categories according to the origin of the salt. These sources of the chloride content are ground water, surface runoff, accreted deposits, bank storage, agricultural irrigation, oil field brines, other industries, and population excreta. Accreted deposits and bank storage are not, of course, primary sources of chlorides but must be considered since they act variously as sources and sinks. Other groupings of these chlorides would also suffice.

In order to make a materials balance on the chlorides, one might start by writing an equation of the form

$$X = Y_1 + Y_2 \pm Y_3 \pm Y_4 + Y_5 + Y_6 + Y_7 + Y_8 , \tag{15}$$

where X = the total chlorides and

Y_i = the fraction of the chlorides attributable to the ith source.

i = 1 for ground water,
2 for surface runoff,
3 for accreted deposits,
4 for bank storage,
5 for agricultural irrigation,
6 for oil field brines,
7 for other industries, and
8 for population excreta.

This equation may be evaluated by making assumptions of the various values on the right-hand side of the equation for various flow conditions. Each equation obtained from an assumption would be put into a set of simultaneous equations as a row matrix. The matrix made up of this set would then be solved for the various components under conditions other than that for the assumed value.

That part of the chlorides contributed by population excreta may be rather accurately determined by multiplying the population by a per capita excretion of approximately 7.7×10^{-6} tons per day (20). These chlorides may be a few hours or several days in getting into the stream, dependent upon the mode of treatment of the wastes. However, the amount of chlorides going into the stream should soon reach an equilibrium and enter at a constant rate regardless of stream flow or other factors.

The chlorides contributed by other industries, source number seven in the listed formulation, should be fairly readily determined by reference to the types of industrial processes in use on the watershed. The wastes from most industries have been categorized rather narrowly as to types and amounts. Therefore, the amount of chlorides contributed by these industries may be calculated from the industrial production on the drainage basin.

The portion of the total chlorides that comes from oil field brines presents a difficult problem in estimation because of the reluctance of the oil industry to give out self-damaging information and because of the erratic release to the streams. The most logical scheme seems to be a sampling of the well-head crude of each producing well, an analysis of the sample obtained, the calculation of the total pumpage by use of the monthly allowable set by the regulating agency or by metering, and the estimation of the total chlorides from the well-head analysis and the pumping rate of the well. The amount of chlorides thus determined should be corrected by subtracting the amount of the reinjected brine where this is practiced. Much of the brine from oil wells will be ponded and released either during high flows or erratically with mostly seepage from the ponds entering the stream in dry weather. However, the time of the

chlorides contribution from this source should affect the accreted deposit determination and does not have to be considered separately.

In almost all cases, there is an off-season for agricultural irrigation, a time when Y_5 can be assumed equal to zero. In the selection of such a time, cognizance should be taken of the fact that the percolation of the irrigation water will continue for some time after the irrigation is stopped. Additionally, most irrigation water is repeatedly applied in small amounts that cause a build-up of salts in the soil; then, the water is occasionally used in massive quantities to flush the salts that have accumulated from evaporation (39). This effect of irrigation should be accounted for under the third item of accreted deposits.

Bank storage of water with chlorides occurs during times of high flow; that is, when the river level exceeds the level of the ground water table in its banks. This water is released during times of lowering flows. The net effect of this phenomenon is probably not too great. The bank storage contribution of chlorides, Y_4, as distinguished from ground water infiltration, may be assumed equal to zero in times of low flow for the purpose of solving the system of equations.

The accreted deposits of chlorides will be variously contributing to and taking from the total salt content; therefore, the term Y_3 in Equation 15 is shown as plus or minus. The amount of chlorides being transferred depends upon the river stage, change in stage, time since last flushing of the deposits, and location of rainfall entering the runoff in the case of a contribution of chlorides and depends upon the river stage and evaporation rate for a removal of chlorides by this action. All these factors except the location of the rainfall are readily accountable and should give a good estimate of the effects of accretion on the chlorides content of the river. The term Y_3 may be assumed equal to zero during periods of sustained relatively high flows when practically all of the sand flats of the river are submerged.

The surface runoff is ordinarily very lightly mineralized as a result of relatively short contact time with mineral outcroppings. The amount of

chlorides contributed by surface runoff should be proportional to the amount of runoff, within a reasonable range of flow. The term Y_2 in the equation should be represented by the product of a constant times the runoff and would, of course, equal zero in times of drought.

The chlorides that come from ground water are emitted in springs and seeps with concentrations ranging from several mg/l to saturation at about 200,000 mg/l. Ground waters in general are much more highly mineralized than surface runoff, and it is the ratio of the quantities of ground water to runoff that causes the mineral concentration of the river to vary with the amount of flow (45). The amount of chlorides from ground water should be the product of some constant times the ground water volume. This volume may be estimated by a method described by Metzler (52) and should be approximately constant over short periods of time, maybe for a few days.

These techniques described here should be applicable to running a materials-balance type prediction of future water qualities, a prediction that could account for the addition of or removal of salt sources.

VII. CONCLUSIONS

Good predictions of water quality for engineering uses may be made at the present time. Better predictions will be possible when better quality records are available.

The inorganic quality of stream flows may be estimated from the quantity of flow by a hyperbolic form, a logarithmic form with constant exponent, or a logarithmic form with variable exponent relationship. The first of these methods gives a rough estimate with a minimum amount of data. The second gives an improved, refined relation and differs from the hyperbolic form only in permitting an exponent of one variable that differs from the value of unity. Again, this relationship may be determined from a minimum amount of data and will give a rather rough estimate. The third method, that of using a variable exponent, is the principal technique described in this work and is recommended for the best estimate of quality from quantity that is available at this time.

Other correlations were tried with very limited success. From these correlation attempts, it was concluded that oil production cannot successfully be linked to chlorides with a simple function because too many important variables are as yet unaccounted for and that secular trends would require data for a much longer period than ten years since only one effective point is gained per year of data; however, seasonal trends may be noted in the data used here.

Frequency analyses led to the use of a modified Cauchy function to describe the probability densities. This function gave rather good fits over the practical range of need, up to several times the medial value. The frequencies of extreme values were determined by the methods of Gumbel using the first and third asymptotes. A strong tool in the statistics of extreme flows is that the large flows, those above some basic stage, have a straight-line semi-logarithmic relation with their return periods.

The materials balance method of accounting for dissolved minerals in

time and space would probably lead to the best estimates of water quality; however, better data than are now available would be required to use this procedure effectively. The continuously measured quality and quantity must be known in order to accurately balance materials of pollution. The U. S. Public Health Service has been measuring the continuous conductivity and stream flow at some 65 stations on the Red and Arkansas Rivers and should make these data available in the near future.

Effective use of water quality and quantity data for making predictions of water quality requires not only the utmost care and diligence in the collection of the data but also due regard to preserving the continuity aspects of the data when they are reduced.

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APPENDIX A

ID No.	Flow	K
392461001	920.0	2710
392461002	800.0	2910
392461003	750.0	3010
392461004	700.0	3120
392461005	700.0	3180
392461006	650.0	3710
392461007	640.0	3720
392461008	650.0	3690
392461009	620.0	3550
392461010	2900.0	3980
392461011	7550.0	1660
392461012	20000.0	1380
392461013	8700.0	1490
392461014	6000.0	1550
392461015	4210.0	1610
392461016	9400.0	2370
392461017	6800.0	1690
392461018	5930.0	1510
392461019	4750.0	1460
392461020	4450.0	1380
392461021	3700.0	1300
392461022	2650.0	1440
392461023	3550.0	1220
392461024	2420.0	1260
392461025	3050.0	2400
392461026	2200.0	1690
392461027	2510.0	2020
392461028	2580.0	3550
392461029	2660.0	1740
392461030	2240.0	1890
392461031	1820.0	1870
392461101	1700.0	2090
392461102	1480.0	2280
392461103	5630.0	1010
392461104	10580.0	1350
392461105	10590.0	3730
392461106	28500.0	984
392461107	29500.0	856
392461108	25500.0	725
392461109	24000.0	575
392461110	26800.0	613
392461111	18800.0	554
392461112	15500.0	764
392461113	8850.0	952
392461114	7100.0	1050
392461115	2420.0	1300
392461116	4340.0	1350
392461117	4650.0	1240
392461118	3980.0	1240
392461119	2930.0	1650
392461120	2580.0	2020
392461121	2400.0	2080
392461122	2280.0	2430
392461123	2170.0	2630
392461124	1940.0	2400
392461125	1760.0	2370
392461126	4910.0	1000
392461127	4000.0	1280
392461128	3180.0	1340
392461129	2580.0	2630
392461130	2280.0	3620
392461201	2030.0	4340
392461202	1810.0	4260
392461203	1630.0	4240
392461204	1520.0	4560
392461205	1550.0	4560
392461206	1330.0	4560
392461207	1300.0	4180
392461208	1200.0	3980
392461209	1200.0	3900
392461210	127500.0	681
392461211	56000.0	561
392461212	117500.0	396
392461213	78000.0	441
392461214	61200.0	444
392461215	44000.0	383
392461216	25400.0	363
392461217	15300.0	505
392461218	10300.0	875
392461219	8700.0	1030
392461220	7600.0	1220
392461221	5490.0	1350
392461222	3750.0	1850
392461223	3480.0	2460
392461224	3220.0	2450
392461225	2760.0	2600
392461226	2410.0	2860
392461227	2300.0	3090
392461228	2200.0	3280
392461229	2600.0	2970
392461230	2750.0	3450
392461231	2310.0	2820
392470101	1880.0	3480
392470102	1870.0	3540
392470103	2120.0	3880
392470104	1200.0	4400
392470105	1300.0	4350
392470106	1400.0	4300
392470107	1500.0	4300
392470108	1600.0	4300
392470109	1760.0	4290
392470110	1800.0	4360
392470111	1900.0	3980
392470112	1900.0	4290
392470113	1810.0	4860
392470114	2420.0	5220
392470115	2050.0	5730
392470116	2000.0	6160
392470117	1800.0	5610
392470118	1720.0	4860
392470119	1620.0	4750
392470120	1720.0	4540
392470121	2110.0	3980
392470122	1880.0	3840
392470123	2110.0	3970
392470124	1700.0	3530
392470125	1520.0	3560
392470126	1500.0	3950
392470127	1430.0	4210
392470128	1430.0	4300
392470129	1430.0	4520
392470130	1460.0	4340
392470131	1240.0	4490
392470201	1200.0	4650
392470202	1190.0	4570
392470203	1140.0	4830
392470204	1040.0	4920
392470205	1010.0	4750
392470206	980.0	5250
392470207	980.0	4540
392470208	980.0	5040
392470209	915.0	4950
392470210	980.0	5140
392470211	900.0	5180
392470212	910.0	4730
392470213	880.0	5640
392470214	842.0	5180
392470215	868.0	4790
392470216	842.0	5880
392470217	840.0	5080
392470218	850.0	5500
392470219	830.0	6000
392470220	840.0	6250
392470221	815.0	6300
392470222	780.0	6370
392470223	780.0	6280
392470224	780.0	6360
392470225	760.0	6600
392470226	730.0	6590
392470227	700.0	6470
392470228	710.0	6120
392470301	710.0	6340
392470302	695.0	6210
392470303	8000.0	6590
392470304	670.0	6640
392470305	660.0	6220
392470306	670.0	6280
392470307	670.0	6920
392470308	650.0	7310
392470309	650.0	7320
392470310	650.0	7270
392470311	645.0	7240
392470312	690.0	7970
392470313	980.0	7280
392470314	1980.0	5460
392470315	3150.0	4700
392470316	2570.0	2670
392470317	1920.0	5260
392470318	1600.0	5340
392470319	1250.0	6640
392470320	1160.0	6630
392470321	1840.0	8760
392470322	1350.0	5500
392470323	1580.0	5140
392470324	1450.0	3580
392470325	1230.0	3960
392470326	1320.0	4230
392470327	1450.0	4000
392470328	1230.0	3970
392470329	1130.0	4000
392470330	1030.0	4160
392470331	980.0	4140
392470401	900.0	4080
392470402	930.0	4400
392470403	1280.0	3680
392470404	3440.0	2720
392470405	5520.0	2170
392470406	5850.0	1520
392470407	5340.0	3020
392470408	5000.0	3220
392470409	4900.0	2930
392470410	6100.0	2550
392470411	46800.0	1420
392470412	33300.0	952
392470413	24500.0	918
392470414	19000.0	658
392470415	26500.0	791
392470416	41200.0	975
392470417	46500.0	676
392470418	31000.0	786
392470419	22400.0	748
392470420	15500.0	898
392470421	13500.0	899
392470422	10400.0	1020
392470423	9100.0	1050
392470424	10150.0	999
392470425	13000.0	971
392470426	27300.0	1470
392470427	24000.0	1450
392470428	18000.0	926
392470429	47000.0	584
392470430	39800.0	780
392470501	29700.0	780
392470502	23500.0	616
392470503	14400.0	715
392470504	12700.0	892
392470505	12300.0	929
392470506	12100.0	1020
392470507	11800.0	957
392470508	11800.0	1270
392470509	8750.0	1670
392470510	6100.0	2460
392470511	5400.0	3090
392470512	5350.0	3200
392470513	117500.0	538
392470514	55000.0	824
392470515	29800.0	824
392470516	32200.0	583
392470517	165000.0	501
392470518	89000.0	622
392470519	82000.0	569
392470520	71200.0	469
392470521	90000.0	615
392470522	57800.0	638
392470523	60500.0	693
392470524	48600.0	564
392470525	66500.0	560
392470526	51000.0	673
392470527	29000.0	731
392470528	20000.0	730
392470529	15500.0	783
392470530	10670.0	1030
392470531	10590.0	1210
392470601	10400.0	1140
392470602	94000.0	544
392470603	53000.0	629
392470604	54000.0	585
392470605	34000.0	527
392470606	13800.0	742
392470607	10500.0	867
392470608	8800.0	997
392470609	6300.0	339
392470610	6200.0	352
392470611	3500.0	367
392470612	3300.0	403
392470613	3000.0	364
392470614	2820.0	313
392470615	2640.0	306
392470616	2380.0	330
392470617	2300.0	346
392470618	2070.0	2410
392470619	2070.0	1360
392470620	1930.0	2680
392470621	2000.0	2700
392470622	8200.0	2490
392470623	5100.0	1090
392470624	34000.0	1490
392470625	21000.0	2240
392470626	13000.0	1230
392470627	19500.0	745
392470628	14500.0	934
392470629	7700.0	899
392470630	4940.0	775
392470701	4550.0	1080
392470702	4550.0	1200

ID No.: sta-yr-mo-da Flow in cusecs K = specific conductance in micromhos

ID No.	Flow	K
392470703	4550.0	1340
392470704	4500.0	1280
392470705	15000.0	1330
392470706	8500.0	1310
392470707	7700.0	2200
392470708	5000.0	1800
392470709	4500.0	1420
392470710	3000.0	1210
392470711	2550.0	1520
392470712	2070.0	1760
392470713	1740.0	1710
392470714	1670.0	2040
392470715	1550.0	2220
392470716	1360.0	2410
392470717	1150.0	2740
392470718	1050.0	2950
392470719	948.0	3180
392470720	956.0	3330
392470721	950.0	3370
392470722	750.0	2950
392470723	1700.0	2530
392470724	1700.0	2950
392470725	1700.0	3080
392470726	3500.0	4870
392470727	5000.0	6610
392470728	3500.0	3270
392470729	3830.0	2500
392470730	2820.0	1560
392470731	2550.0	1540
392470801	2550.0	1530
392470802	2550.0	1320
392470803	2640.0	1030
392470804	2300.0	1010
392470805	1550.0	1450
392470806	1160.0	1670
392470807	1010.0	2040
392470808	964.0	2300
392470809	924.0	2540
392470810	908.0	2780
392470811	884.0	2950
392470812	868.0	2880
392470813	845.0	2910
392470814	792.0	2410
392470815	740.0	3310
392470816	682.0	3590
392470817	634.0	3560
392470818	586.0	3500
392470819	536.0	4170
392470820	498.0	4290
392470821	476.0	4040
392470822	455.0	4120
392470823	440.0	4180
392470824	425.0	4140
392470825	375.0	4140
392470826	335.0	4660
392470827	331.0	5220
392470828	343.0	5240
392470829	343.0	6100
392470830	335.0	5930
392470831	319.0	5530
392470901	299.0	5420
392470902	284.0	5610
392470903	270.0	5540
392470904	244.0	5990
392470905	238.0	6370
392470906	231.0	6070
392470907	225.0	6500
392470908	228.0	6200
392470909	231.0	6140
392470910	210.0	6020
392470911	216.0	5700
392470912	1790.0	5170
392470913	2640.0	1340
392470914	1300.0	1240
392470915	1580.0	1850
392470916	1930.0	5780
392470917	956.0	4200
392470918	634.0	4200
392470919	460.0	5690
392470920	455.0	5870
392470921	558.0	6560
392470922	640.0	5290
392470923	668.0	4310
392470924	792.0	4880
392470925	800.0	6130
392470926	598.0	7280
392470927	486.0	7340
392470928	406.0	8880
392470929	351.0	7870
392470930	327.0	8530
392471001	303.0	9670
392471002	274.0	8280
392471003	250.0	6580
392471004	234.0	5970
392471005	222.0	6240
392471006	207.0	6540
392471007	201.0	6750
392471008	190.0	6590
392471009	181.0	6290
392471010	176.0	5880
392471011	170.0	6080
392471012	170.0	6360
392471013	167.0	6300
392471014	162.0	6100
392471015	160.0	6310
392471016	157.0	6540
392471017	160.0	6350
392471018	2260.0	2530
392471019	2000.0	1070
392471020	1500.0	1040
392471021	600.0	1180
392471022	375.0	1410
392471023	486.0	2800
392471024	398.0	1640
392471025	388.0	3360
392471026	1600.0	4850
392471027	1410.0	2720
392471028	1500.0	5960
392471029	600.0	5140
392471030	500.0	6720
392471031	616.0	8860
392471101	520.0	9510
392471102	425.0	8110
392471103	375.0	7480
392471104	343.0	6250
392471105	327.0	6250
392471106	315.0	6210
392471107	292.0	5700
392471108	270.0	5280
392471109	257.0	5780
392471110	257.0	5760
392471111	257.0	5430
392471112	250.0	6060
392471113	247.0	6050
392471114	250.0	5150
392471115	2000.0	2900
392471116	2000.0	2740
392471117	2000.0	4310
392471118	1550.0	9720
392471119	1230.0	4640
392471120	964.0	7930
392471121	900.0	5480
392471122	1300.0	2580
392471123	1800.0	3470
392471124	1670.0	3470
392471125	1500.0	3400
392471126	1100.0	6930
392471127	808.0	7080
392471128	654.0	6940
392471129	564.0	7490
392471130	492.0	5810
392471201	445.0	5490
392471202	420.0	6610
392471203	398.0	5230
392471204	406.0	5860
392471205	393.0	5900
392471206	411.0	4640
392471207	3000.0	1440
392471208	4000.0	1980
392471209	3300.0	3730
392471210	2220.0	2140
392471211	1430.0	2960
392471212	1050.0	2960
392471213	892.0	4250
392471214	785.0	4480
392471215	830.0	3710
392471216	956.0	2900
392471217	932.0	3040
392471218	1060.0	3470
392471219	1030.0	2610
392471220	808.0	3020
392471221	661.0	3500
392471222	586.0	4110
392471223	530.0	4820
392471224	492.0	5480
392471225	455.0	5050
392471226	435.0	95
392471227	430.0	6840
392471228	425.0	6360
392471229	406.0	6930
392471230	402.0	7780
392471231	400.0	8040
392480101	12700.0	640
392480102	12700.0	72
392480103	11500.0	340
392480104	7260.0	328
392480105	3610.0	77
392480106	2220.0	70
392480107	1570.0	82
392480108	1350.0	2560
392480109	1170.0	804
392480110	990.0	1280
392480111	920.0	4670
392480112	870.0	2650
392480113	855.0	1890
392480114	825.0	3200
392480115	790.0	5090
392480116	760.0	1990
392480117	660.0	535
392480118	630.0	118
392480119	560.0	5740
392480120	540.0	5850
392480121	520.0	5610
392480122	520.0	6040
392480123	484.0	256
392480124	430.0	2770
392480125	390.0	894
392480126	320.0	4920
392480127	270.0	2970
392480128	250.0	8100
392480129	260.0	306
392480130	270.0	8420
392480131	270.0	304
392480201	280.0	7850
392480202	340.0	292
392480203	270.0	132
392480204	270.0	126
392480205	725.0	133
392480206	2030.0	85
392480207	4090.0	900
392480208	3690.0	1000
392480209	2470.0	1200
392480210	1900.0	98
392480211	1530.0	107
392480212	1590.0	95
392480213	1680.0	78
392480214	2110.0	70
392480215	2100.0	70
392480216	4990.0	1450
392480217	5920.0	101
392480218	4030.0	1610
392480219	2490.0	1640
392480220	1780.0	2010
392480221	1410.0	2700
392480222	1180.0	4000
392480223	1070.0	3710
392480224	1060.0	4080
392480225	1590.0	3510
392480226	15100.0	1020
392480227	39500.0	801
392480228	30400.0	1430
392480229	23300.0	982
392480301	39700.0	697
392480302	38000.0	732
392480303	25600.0	1190
392480304	14100.0	1210
392480305	9990.0	1490
392480306	8490.0	1230
392480307	8200.0	1420
392480308	6940.0	1130
392480309	6000.0	1300
392480310	4400.0	1610
392480311	3300.0	1750
392480312	2700.0	1190
392480313	3100.0	2010
392480314	8200.0	1490
392480315	16700.0	1750
392480316	13000.0	2090
392480317	8450.0	1650
392480318	8000.0	1620
392480319	4400.0	1490
392480320	6700.0	1390
392480321	6400.0	1380
392480322	9000.0	1200
392480323	16100.0	1330
392480324	11200.0	1230
392480325	9780.0	1650
392480326	9440.0	1660
392480327	10900.0	1180
392480328	13700.0	1800
392480329	10200.0	1220
392480330	7820.0	977
392480331	5840.0	1120
392480401	4600.0	945
392480402	3900.0	1040

ID No.	Flow	K
392480403	3200.0	1280
392480404	2500.0	1330
392480405	2400.0	1930
392480406	1800.0	2400
392480407	1700.0	2270
392480408	1700.0	2570
392480409	1600.0	3000
392480410	1400.0	2700
392480411	4600.0	1770
392480412	3000.0	2120
392480413	2340.0	152
392480414	1870.0	2710
392480415	1510.0	3240
392480416	1270.0	3690
392480417	1080.0	4780
392480418	935.0	6570
392480419	835.0	5770
392480420	770.0	6180
392480421	730.0	7140
392480422	710.0	5510
392480423	660.0	6310
392480424	6[illegible]	5920
392480425	640.0	5490
392480426	665.0	5780
392480427	680.0	6010
392480428	855.0	6020
392480429	2440.0	6330
392480430	2690.0	5960
392480501	2540.0	5270
392480502	2240.0	3590
392480503	1900.0	3920
392480504	1670.0	2750
392480505	1310.0	2690
392480506	2930.0	3020
392480507	6320.0	3620
392480508	2180.0	3250
392480509	1720.0	4660
392480510	2320.0	1680
392480511	8140.0	1790
392480512	22000.0	2810
392480513	15000.0	2170
392480514	9420.0	1200
392480515	6770.0	1070
392480516	12200.0	860
392480517	14900.0	583
392480518	11600.0	408
392480519	9280.0	624
392480520	6240.0	999
392480521	5080.0	977
392480522	4500.0	835
392480523	2450.0	1020
392480524	1820.0	1530
392480525	2430.0	1590
392480526	14900.0	2200
392480527	13800.0	2380
392480528	7540.0	1690
392480529	4200.0	2390
392480530	2980.0	2080
392480531	2870.0	2280
392480601	9550.0	2250
392480602	12400.0	2700
392480603	7870.0	1910
392480604	4160.0	1720
392480605	2950.0	1580
392480606	2430.0	1770
392480607	2180.0	1890
392480608	1[illegible]20.0	1810
392480609	15[illegible]0.0	2430
392480610	1210.0	2350
392480611	1060.0	2360
392480612	930.0	2620
392480613	845.0	2910
392480614	1670.0	3120
392480615	1040.0	920
392480616	1030.0	2730
392480617	1300.0	3360
392480618	1070.0	3640
392480619	940.0	3970
392480620	910.0	4390
392480621	1000.0	3800
392480622	40000.0	1320
392480623	57600.0	920
392480624	200000.0	522
392480625	200000.0	457
392480626	100000.0	430
392480627	74200.0	512
392480628	71800.0	545
392480629	65500.0	566
392480630	55000.0	649
392480701	37500.0	651
392480702	30200.0	621
392480703	23900.0	613
392480704	19000.0	614
392480705	20700.0	702
392480706	20800.0	1210
392480707	14600.0	1080
392480708	13000.0	1460
392480709	18500.0	1510
392480710	14900.0	957
392480711	20200.0	649
392480712	35000.0	1272
392480713	22800.0	997
392480714	15800.0	883
392480715	12200.0	798
392480716	11200.0	689
392480717	11500.0	643
392480718	10600.0	692
392480719	9440.0	720
392480720	8810.0	802
392480721	8010.0	834
392480722	7440.0	870
392480723	11600.0	956
392480724	19000.0	870
392480725	11700.0	2130
392480726	9330.0	1780
392480727	7630.0	1780
392480728	4700.0	2070
392480729	3300.0	2160
392480730	2550.0	1950
392480731	2150.0	1870
392480801	1800.0	1930
392480802	1550.0	2450
392480803	1360.0	2750
392480804	1300.0	2840
392480805	1250.0	2840
392480806	1180.0	2930
392480807	1380.0	3420
392480808	2820.0	528
392480809	2000.0	1100
392480810	1550.0	2480
392480811	1500.0	3500
392480812	1550.0	3390
392480813	1550.0	3560
392480814	1500.0	4140
392480815	1740.0	5350
392480816	2070.0	3980
392480817	1800.0	3310
392480818	1440.0	3420
392480819	1560.0	3900
392480820	4800.0	3390
392480821	4680.0	2200
392480822	3000.0	2970
392480823	2460.0	3150
392480824	2380.0	3540
392480825	2910.0	2890
392480826	2140.0	3650
392480827	1800.0	2620
392480828	1500.0	2460
392480829	1360.0	2610
392480830	1170.0	2780
392480831	1040.0	3030
392480901	996.0	3200
392480902	972.0	3500
392480903	940.0	3900
392480904	822.0	3860
392480905	725.0	3940
392480906	654.0	4250
392480907	586.0	3980
392480908	547.0	3790
392480909	508.0	4220
392480910	460.0	4730
392480911	486.0	4630
392480912	481.0	4490
392480913	465.0	4700
392480914	435.0	5000
392480915	406.0	4790
392480916	384.0	5690
392480917	367.0	6560
392480918	355.0	5050
392480919	339.0	4530
392480920	331.0	4650
392480921	323.0	4680
392480922	323.0	4610
392480923	319.0	5000
392480924	315.0	6030
392480925	311.0	6350
392480926	303.0	7040
392480927	295.0	6230
392480928	284.0	6130
392480929	284.0	6350
392480930	278.0	6210
392481001	284.0	5860
392481002	270.0	5990
392481003	258.0	6140
392481004	253.0	6020
392481005	253.0	6470
392481006	224.0	6650
392481007	258.0	6200
392481008	253.0	5960
392481009	240.0	5850
392481010	232.0	5680
392481011	210.0	5700
392481012	210.0	5500
392481013	210.0	5570
392481014	210.0	5750
392481015	210.0	5810
392481016	210.0	6130
392481017	210.0	6190
392481018	210.0	6190
392481019	204.0	6490
392481020	224.0	6150
392481021	228.0	6000
392481022	228.0	6220
392481023	228.0	6260
392481024	224.0	6570
392481025	224.0	6750
392481026	224.0	6680
392481027	228.0	6440
392481028	224.0	6410
392481029	220.0	6560
392481030	228.0	6640
392481031	232.0	6860
392481101	232.0	7060
392481102	236.0	7130
392481103	232.0	6990
392481104	220.0	7150
392481105	240.0	7660
392481106	594.0	8030
392481107	585.0	3990
392481108	516.0	4000
392481109	503.0	3960
392481110	445.0	4990
392481111	423.0	5420
392481112	396.0	5870
392481113	396.0	6640
392481114	552.0	7980
392481115	559.0	6610
392481116	503.0	5180
392481117	451.0	7490
392481118	391.0	7940
392481119	375.0	6560
392481120	335.0	6740
392481121	335.0	8220
392481122	325.0	8310
392481123	307.0	8260
392481124	302.0	8420
392481125	293.0	8160
392481126	284.0	9350
392481127	270.0	8460
392481128	275.0	8780
392481129	266.0	9390
392481130	270.0	9500
392481201	284.0	8650
392481202	288.0	9550
392481203	307.0	9550
392481204	311.0	9575
392481205	330.0	9600
392481206	345.0	9640
392481207	345.0	9610
392481208	340.0	11100
392481209	355.0	10600
392481210	340.0	9940
392481211	340.0	10800
392481212	325.0	9580
392481213	316.0	8920
392481214	320.0	10500
392481215	1950.0	5840
392481216	1860.0	3020
392481217	1220.0	5320
392481218	1140.0	7670
392481219	929.0	11600
392481220	886.0	8240
392481221	819.0	6940
392481222	710.0	9140
392481223	572.0	10300
392481224	559.0	10100
392481225	598.0	10300
392481226	491.0	11900
392481227	479.0	11800
392481228	485.0	11100
392481229	468.0	11700
392481230	439.0	9910
392481231	417.0	10400
392490101	400.0	9090
392490102	386.0	9430

ID No.	Flow	K
392490103	391.0	9090
392490104	355.0	9710
392490105	340.0	9700
392490106	325.0	10300
392490107	311.0	9910
392490108	310.0	10100
392490109	297.0	9710
392490110	302.0	9910
392490111	307.0	10200
392490112	316.0	9320
392490113	325.0	9620
392490114	335.0	9760
392490115	370.0	10100
392490116	417.0	10700
392490117	497.0	10400
392490118	522.0	9320
392490119	578.0	10400
392490120	618.0	10800
392490121	710.0	12600
392490122	732.0	14500
392490123	800.0	14300
392490124	1000.0	11000
392490125	4000.0	6350
392490126	4800.0	6360
392490127	5600.0	4800
392490128	5950.0	2190
392490129	5170.0	1560
392490130	4000.0	1160
392490131	4000.0	871
392490201	1200.0	801
392490202	2000.0	1270
392490203	2240.0	2320
392490204	3500.0	2290
392490205	5200.0	1730
392490206	6500.0	1400
392490207	8000.0	2180
392490208	9200.0	4310
392490209	11000.0	3530
392490210	19000.0	1880
392490211	15000.0	1350
392490212	11000.0	1210
392490213	12000.0	1290
392490214	23000.0	385
392490215	45400.0	1020
392490216	33100.0	814
392490217	28000.0	928
392490218	24000.0	896
392490219	12400.0	788
392490220	9640.0	921
392490221	13600.0	924
392490222	19800.0	1020
392490223	14200.0	1300
392490224	14800.0	1280
392490225	25900.0	1360
392490226	17700.0	1030
392490227	11300.0	853
392490228	8570.0	912
392490301	7460.0	1120
392490302	6380.0	1440
392490303	5950.0	1850
392490304	5820.0	2060
392490305	5680.0	2560
392490306	4680.0	2540
392490307	4100.0	2920
392490308	3540.0	2920
392490309	2940.0	3170
392490310	2570.0	3540
392490311	2320.0	3630
392490312	2240.0	4150
392490313	2160.0	4720
392490314	2080.0	5950
392490315	2000.0	4810
392490316	1930.0	4710
392490317	1930.0	4720
392490318	1930.0	4860
392490319	1800.0	4740
392490320	1750.0	4770
392490321	1750.0	4570
392490322	20000.0	1300
392490323	22000.0	1860
392490324	14500.0	1310
392490325	7500.0	1430
392490326	6400.0	1540
392490327	26000.0	704
392490328	24000.0	1250
392490329	13000.0	1040
392490330	6000.0	1400
392490331	4480.0	1980
392490401	4000.0	2020
392490402	3930.0	2060
392490403	4100.0	2290
392490404	4320.0	2250
392490405	3440.0	2680
392490406	2840.0	3040
392490407	2480.0	3370
392490408	2160.0	3440
392490409	2000.0	3850
392490410	5160.0	2900
392490411	10600.0	2230
392490412	13000.0	3130
392490413	8780.0	2380
392490414	6670.0	1650
392490415	5680.0	1540
392490416	4680.0	1670
392490417	3760.0	1830
392490418	3040.0	2040
392490419	2320.0	2270
392490420	1930.0	2460
392490421	1790.0	2620
392490422	1600.0	2800
392490423	1520.0	3100
392490424	1420.0	3630
392490425	1370.0	4080
392490426	2100.0	3840
392490427	1800.0	3660
392490428	2500.0	3310
392490429	2500.0	3580
392490430	1800.0	4560
392490501	34500.0	2260
392490502	52100.0	1100
392490503	28800.0	974
392490504	16600.0	1040
392490505	10100.0	830
392490506	10600.0	830
392490507	10800.0	849
392490508	12900.0	1080
392490509	24800.0	1550
392490510	19300.0	1100
392490511	13300.0	1210
392490512	11100.0	1250
392490513	11100.0	1290
392490514	8980.0	1290
392490515	8000.0	1130
392490516	8570.0	1340
392490517	13300.0	2230
392490518	74800.0	1580
392490519	155000.0	481
392490520	132000.0	528
392490521	103000.0	691
392490522	71500.0	692
392490523	55000.0	763
392490524	43000.0	729
392490525	38000.0	762
392490526	38000.0	967
392490527	37000.0	710
392490528	31000.0	546
392490529	33000.0	659
392490530	24000.0	525
392490531	24000.0	584
392490601	20000.0	763
392490602	16000.0	778
392490603	16000.0	723
392490604	23000.0	715
392490605	25000.0	758
392490606	22000.0	874
392490607	23000.0	770
392490608	22500.0	884
392490609	25000.0	833
392490610	23000.0	967
392490611	46300.0	2010
392490612	46000.0	1040
392490613	46000.0	718
392490614	69300.0	535
392490615	56200.0	586
392490616	47200.0	585
392490617	43000.0	586
392490618	37000.0	649
392490619	23000.0	799
392490620	14500.0	812
392490621	12100.0	883
392490622	8780.0	939
392490623	7460.0	1020
392490624	7130.0	1310
392490625	7810.0	1410
392490626	7810.0	1570
392490627	8380.0	1590
392490628	10600.0	1590
392490629	9410.0	1570
392490630	8180.0	1720
392490701	7000.0	1320
392490702	5500.0	1340
392490703	4800.0	1410
392490704	4210.0	1570
392490705	3650.0	1610
392490706	3130.0	1710
392490707	2750.0	1990
392490708	3130.0	3120
392490709	3130.0	2250
392490710	2480.0	3860
392490711	2160.0	4050
392490712	2000.0	3430
392490713	1860.0	2660
392490714	1790.0	2850
392490715	1790.0	3950
392490716	1720.0	3520
392490717	1540.0	5560
392490718	2700.0	4950
392490719	4500.0	2110
392490720	3500.0	2070
392490721	3000.0	2620
392490722	4000.0	2500
392490723	3200.0	1970
392490724	2500.0	2080
392490725	2000.0	2180
392490726	1860.0	2320
392490727	1660.0	2270
392490728	1540.0	2410
392490729	1500.0	2390
392490730	1500.0	2520
392490731	1600.0	2630
392490801	1540.0	2670
392490802	1420.0	2620
392490803	1100.0	2440
392490804	900.0	2900
392490805	1100.0	3340
392490806	900.0	3810
392490807	900.0	3150
392490808	903.0	4040
392490809	835.0	4580
392490810	702.0	4240
392490811	646.0	3620
392490812	787.0	3630
392490813	2000.0	2600
392490814	1660.0	2620
392490815	1460.0	3210
392490816	1140.0	2940
392490817	956.0	3470
392490818	835.0	3660
392490819	1000.0	5460
392490820	1490.0	5080
392490821	1100.0	4530
392490822	800.0	4440
392490823	803.0	4790
392490824	718.0	6450
392490825	585.0	9220
392490826	503.0	6230
392490827	445.0	5400
392490828	407.0	5490
392490829	370.0	5390
392490830	355.0	5270
392490831	355.0	5110
392490901	335.0	5490
392490902	320.0	5470
392490903	316.0	5740
392490904	297.0	5560
392490905	297.0	5790
392490906	297.0	6000
392490907	345.0	6350
392490908	407.0	6410
392490909	386.0	6100
392490910	800.0	6060
392490911	1000.0	3450
392490912	1100.0	5010
392490913	1300.0	5120
392490914	7320.0	2700
392490915	5040.0	1440
392490916	7300.0	5300
392490917	8180.0	5860
392490918	8380.0	3330
392490919	5040.0	1680
392490920	3870.0	1690
392490921	2940.0	1330
392490922	1930.0	1720
392490923	1460.0	2140
392490924	1200.0	2310
392490925	1100.0	2490
392490926	920.0	2410
392490927	811.0	2440
392490928	718.0	2630
392490929	625.0	2920
392490930	578.0	3200
392491001	503.0	3590
392491002	491.0	4310
392491003	468.0	3950
392491004	652.0	3760

ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K
392491005	2450.0	3110	392491120	528.0	8600	392500123	2320.0	3220	392500319	1300.0	5150	392500513	118000.0	459
392491006	3230.0	2520	392491130	534.0	8200	392500124	2080.0	3610	392500320	1120.0	5130	392500514	71600.0	512
392491007	1980.0	2660	392491201	500.0	7730	392500125	2080.0	3450	392500321	1090.0	5290	392500515	56200.0	458
392491008	1320.0	2890	392491202	503.0	8780	392500126	1930.0	3710	392500322	938.0	6250	392500516	39300.0	564
392491009	1040.0	3530	392491203	462.0	8760	392500127	2000.0	4110	392500323	860.0	6010	392500517	24200.0	602
392491010	938.0	4210	392491204	456.0	8730	392500128	2480.0	3790	392500324	787.0	6110	392500518	19300.0	741
392491011	1080.0	4900	392491205	451.0	8630	392500129	2480.0	3370	392500325	740.0	6820	392500519	22600.0	670
392491012	2320.0	8170	392491206	434.0	9070	392500130	2240.0	3860	392500326	646.0	6940	392500520	21100.0	624
392491013	2570.0	7190	392491207	445.0	9330	392500131	2080.0	4120	392500327	638.0	6700	392500521	16200.0	883
392491014	2000.0	5110	392491208	445.0	8050	392500201	2320.0	3790	392500328	578.0	7450	392500522	13300.0	937
392491015	1300.0	3470	392491209	445.0	8640	392500202	2400.0	3200	392500329	559.0	6960	392500523	12100.0	1070
392491016	886.0	3320	392491210	451.0	9300	392500203	3710.0	3010	392500330	534.0	6760	392500524	9860.0	1310
392491017	710.0	4230	392491211	566.0	9640	392500204	5040.0	2120	392500331	516.0	6800	392500525	7130.0	1530
392491018	604.0	4390	392491212	886.0	9200	392500205	5040.0	1790	392500401	503.0	6990	392500526	4800.0	1990
392491019	540.0	4530	392491213	903.0	6250	392500206	4440.0	1810	392500402	497.0	8420	392500527	3870.0	2690
392491020	485.0	4650	392491214	787.0	6370	392500207	3330.0	2100	392500403	6340.0	6290	392500528	6230.0	2400
392491021	491.0	5040	392491215	630.0	7580	392500208	2480.0	2600	392500404	14700.0	1430	392500529	6090.0	1950
392491022	479.0	5370	392491216	578.0	8090	392500209	2000.0	2930	392500405	7300.0	2930	392500530	6520.0	3850
392491023	1400.0	5880	392491217	763.0	10200	392500210	1720.0	3150	392500406	6230.0	975	392500531	8980.0	2160
392491024	2400.0	5150	392491218	803.0	12700	392500211	1530.0	3860	392500407	6090.0	1140	392500601	8780.0	2450
392491025	4600.0	3560	392491219	827.0	11600	392500212	18900.0	1570	392500408	5555.0	1200	392500602	7810.0	1800
392491026	7300.0	4300	392491220	803.0	9230	392500213	40200.0	1880	392500409	3870.0	1740	392500603	5820.0	1740
392491027	5420.0	3780	392491221	803.0	8140	392500214	33100.0	1440	392500410	2570.0	1660	392500604	4920.0	1600
392491028	3980.0	2990	392491222	1160.0	6890	392500215	22100.0	770	392500411	1930.0	2330	392500605	6670.0	1780
392491029	3130.0	2970	392491223	1930.0	6130	392500216	16200.0	657	392500412	1440.0	2970	392500606	6820.0	3740
392491030	2570.0	2750	392491224	1930.0	3850	392500217	9230.0	692	392500413	1140.0	3400	392500607	4440.0	3720
392491031	2160.0	1940	392491225	1660.0	5130	392500218	5950.0	1140	392500414	992.0	3840	392500608	3330.0	2520
392491101	1860.0	2060	392491226	2880.0	6030	392500219	4800.0	1520	392500415	869.0	4170	392500609	3130.0	2000
392491102	1540.0	2580	392491227	4560.0	2810	392500220	3980.0	1870	392500416	803.0	4680	392500610	2750.0	1860
392491103	1240.0	3400	392491228	4100.0	1890	392500221	3440.0	2360	392500417	787.0	4710	392500611	2940.0	1750
392491104	1000.0	3430	392491229	3040.0	2160	392500222	3230.0	2490	392500418	763.0	5520	392500612	8260.0	1740
392491105	852.0	3080	392491230	2240.0	3440	392500223	2940.0	2450	392500419	787.0	6320	392500613	8340.0	1960
392491106	740.0	3130	392491231	2000.0	4260	392500224	2570.0	2650	392500420	835.0	7600	392500614	4920.0	2710
392491107	673.0	3330	392500101	2940.0	4880	392500225	2400.0	3010	392500421	860.0	7220	392500615	3760.0	5090
392491108	646.0	3820	392500102	4560.0	2040	392500226	2080.0	3400	392500422	929.0	8750	392500616	2940.0	3500
392491109	592.0	4100	392500103	5040.0	1980	392500227	2000.0	3770	392500423	947.0	9190	392500617	2660.0	2220
392491110	528.0	4600	392500104	5420.0	1860	392500228	1860.0	3980	392500424	869.0	9620	392500618	2480.0	1770
392491111	497.0	5070	392500105	6090.0	1480	392500301	1720.0	4840	392500425	835.0	9010	392500619	2400.0	1790
392491112	516.0	5180	392500106	5950.0	1600	392500302	1600.0	5230	392500426	732.0	9430	392500620	2320.0	1530
392491113	566.0	5890	392500107	4920.0	2690	392500303	1540.0	4680	392500427	702.0	9370	392500621	1720.0	1310
392491114	646.0	6420	392500108	3980.0	4570	392500304	1790.0	4980	392500428	710.0	9320	392500622	1300.0	1490
392491115	886.0	6880	392500109	4560.0	5330	392500305	1860.0	4180	392500429	1720.0	6380	392500623	1460.0	1800
392491116	819.0	7030	392500110	8550.0	3540	392500306	1600.0	4650	392500430	3130.0	4870	392500624	1720.0	2450
392491117	688.0	5500	392500111	11600.0	2870	392500307	1540.0	5230	392500501	3650.0	3950	392500625	1790.0	5380
392491118	632.0	7300	392500112	9640.0	2740	392500308	1480.0	5120	392500502	2240.0	2080	392500626	1520.0	3960
392491119	566.0	8700	392500113	10200.0	2050	392500309	1430.0	5490	392500503	2480.0	4070	392500627	1200.0	3670
392491120	516.0	7980	392500114	23600.0	690	392500310	1320.0	5230	392500504	4560.0	2270	392500628	1100.0	3470
392491121	509.0	7980	392500115	19300.0	953	392500311	1380.0	5770	392500505	2660.0	2200	392500629	1390.0	3510
392491122	503.0	8560	392500116	16900.0	633	392500312	2890.0	5060	392500506	1600.0	3540	392500630	1090.0	3240
392491123	468.0	8560	392500117	13300.0	500	392500313	3230.0	2650	392500507	20800.0	3280	392500701	1000.0	3220
392491124	462.0	8480	392500118	8450.0	856	392500314	3040.0	3230	392500508	20200.0	1560	392500702	852.0	3710
392491125	522.0	9020	392500119	4800.0	1600	392500315	2400.0	4600	392500509	13000.0	1360	392500703	787.0	4070
392491126	516.0	9280	392500120	3540.0	2500	392500316	2000.0	5230	392500510	41800.0	2120	392500704	2940.0	3670
392491127	503.0	9720	392500121	2040.0	2550	392500317	1660.0	4940	392500511	218000.0	621	392500705	3540.0	1720
392491128	491.0	9340	392500122	2570.0	2700	392500318	1400.0	5040	392500512	140000.0	499	392500706	10800.0	1890

ID No.	Flow	K
392500707	11900.0	930
392500708	11900.0	1020
392500709	11900.0	1520
392500710	8980.0	2080
392500711	45400.0	1980
392500712	38500.0	1480
392500713	18100.0	1640
392500714	10300.0	1410
392500715	9200.0	888
392500716	8980.0	1180
392500717	7810.0	841
392500718	29600.0	1040
392500719	35400.0	1140
392500720	29600.0	1030
392500721	39300.0	1060
392500722	69300.0	904
392500723	81100.0	560
392500724	71600.0	524
392500725	60400.0	642
392500726	71600.0	699
392500727	47200.0	657
392500728	33100.0	657
392500729	61600.0	702
392500730	64800.0	563
392500731	43600.0	746
392500801	33800.0	584
392500802	25900.0	531
392500803	37700.0	971
392500804	24800.0	822
392500805	21600.0	909
392500806	21100.0	974
392500807	14500.0	937
392500808	11100.0	922
392500809	10800.0	1150
392500810	8980.0	1200
392500811	7300.0	1240
392500812	6230.0	1390
392500813	6090.0	1570
392500814	5950.0	1620
392500815	5820.0	1690
392500816	6520.0	1590
392500817	8570.0	1840
392500818	8180.0	2200
392500819	11600.0	1470
392500820	10300.0	1680
392500821	7130.0	1760
392500822	6670.0	1230
392500823	6230.0	1460
392500824	9770.0	1500
392500825	11900.0	2040
392500826	7640.0	1840
392500827	6520.0	1930
392500828	5950.0	1780
392500829	16700.0	1870
392500830	18500.0	1400
392500831	9410.0	1160
392500901	7130.0	1030
392500902	6520.0	1160
392500903	8180.0	1280
392500904	8570.0	1080
392500905	7810.0	1130
392500906	7300.0	1200
392500907	6090.0	1630
392500908	6380.0	1580
392500909	6820.0	1950
392500910	7300.0	1410
392500911	5550.0	1310
392500912	4920.0	1340
392500913	5300.0	1460
392500914	19100.0	1170
392500915	36900.0	1090
392500916	122000.0	854
392500917	103000.0	404
392500918	50100.0	412
392500919	45400.0	377
392500920	36900.0	352
392500921	29000.0	441
392500922	19300.0	600
392500923	12100.0	874
392500924	9640.0	838
392500925	6380.0	927
392500926	5040.0	1100
392500927	4560.0	1280
392500928	4210.0	1360
392500929	3980.0	1460
392500930	3870.0	1510
392501001	3760.0	1590
392501002	6090.0	1770
392501003	6520.0	1540
392501004	6380.0	1400
392501005	5040.0	1460
392501006	4560.0	1610
392501007	4560.0	1760
392501008	3980.0	2200
392501009	3540.0	1850
392501010	3230.0	1940
392501011	3330.0	1930
392501012	3040.0	2080
392501013	2750.0	2080
392501014	2660.0	1950
392501015	2400.0	2060
392501016	2320.0	2050
392501017	2320.0	2130
392501018	2400.0	2140
392501019	2400.0	2140
392501020	2400.0	2170
392501021	2320.0	2170
392501022	2000.0	2310
392501023	1720.0	2530
392501024	1540.0	2760
392501025	1390.0	2860
392501026	1230.0	3070
392501027	1160.0	3310
392501028	1090.0	3460
392501029	1010.0	3890
392501030	965.0	3820
392501031	956.0	4170
392501101	920.0	4380
392501102	894.0	4630
392501103	878.0	4760
392501104	965.0	4850
392501105	965.0	5370
392501106	869.0	6090
392501107	869.0	5660
392501108	886.0	5230
392501109	827.0	4960
392501110	827.0	6040
392501111	779.0	7040
392501112	755.0	7060
392501113	755.0	6920
392501114	748.0	6840
392501115	755.0	6200
392501116	755.0	6110
392501117	740.0	6350
392501118	718.0	6070
392501119	710.0	5810
392501120	718.0	6340
392501121	702.0	6630
392501122	673.0	6630
392501123	659.0	6720
392501124	604.0	7200
392501125	592.0	7610
392501126	592.0	6900
392501127	592.0	7990
392501128	592.0	8860
392501129	592.0	8090
392501130	585.0	8000
392501201	585.0	7900
392501202	585.0	7620
392501203	585.0	7870
392501204	585.0	8070
392501205	540.0	8400
392501206	490.0	7950
392501207	490.0	7950
392501208	520.0	7950
392501209	560.0	7960
392501210	611.0	8550
392501211	598.0	8090
392501212	604.0	7950
392501213	585.0	10000
392501214	611.0	8490
392501215	604.0	8330
392501216	604.0	8000
392501217	611.0	8200
392501218	639.0	8950
392501219	625.0	9540
392501220	639.0	9570
392501221	652.0	8980
392501222	652.0	9210
392501223	659.0	9200
392501224	659.0	8880
392501225	646.0	8640
392501226	625.0	8590
392501227	598.0	8170
392501228	625.0	8040
392501229	611.0	9260
392501230	652.0	9500
392501231	639.0	11800
392510101	710.0	8450
392510102	755.0	9040
392510103	787.0	7020
392510104	819.0	6590
392510105	835.0	6140
392510106	869.0	6460
392510107	869.0	6300
392510108	992.0	9660
392510109	1010.0	9760
392510110	938.0	10900
392510111	938.0	8200
392510112	938.0	8010
392510113	974.0	7570
392510114	1350.0	5480
392510115	1720.0	5120
392510116	2660.0	4840
392510117	2660.0	6240
392510118	2240.0	10400
392510119	1930.0	8400
392510120	1660.0	7730
392510121	1400.0	8320
392510122	1200.0	7320
392510123	1160.0	6040
392510124	1090.0	6100
392510125	992.0	5490
392510126	1030.0	4770
392510127	1180.0	5080
392510128	1090.0	4560
392510129	920.0	4670
392510130	800.0	4800
392510131	600.0	5000
392510201	440.0	5200
392510202	350.0	5400
392510203	490.0	5600
392510204	690.0	5730
392510205	970.0	5600
392510206	1280.0	6420
392510207	1160.0	5200
392510208	1050.0	5760
392510209	1060.0	6310
392510210	956.0	6110
392510211	1020.0	6210
392510212	1020.0	8280
392510213	920.0	8550
392510214	886.0	7640
392510215	670.0	6850
392510216	878.0	5170
392510217	1420.0	3550
392510218	6770.0	3280
392510219	13300.0	1520
392510220	38300.0	1740
392510221	39300.0	1270
392510222	29800.0	1380
392510223	19300.0	802
392510224	13800.0	714
392510225	8180.0	892
392510226	7640.0	935
392510227	7300.0	1020
392510228	6230.0	1120
392510301	5170.0	1400
392510302	4210.0	1790
392510303	3440.0	2320
392510304	3040.0	2920
392510305	4560.0	3740
392510306	3440.0	2400
392510307	2840.0	2680
392510308	2400.0	2780
392510309	2240.0	2960
392510310	2830.0	2680
392510311	11600.0	2110
392510312	27100.0	2030
392510313	21200.0	1750
392510314	12700.0	1110
392510315	10100.0	915
392510316	9410.0	850
392510317	7810.0	944
392510318	6380.0	1260
392510319	5550.0	2140
392510320	4560.0	2450
392510321	3980.0	2560
392510322	3440.0	2750
392510323	3130.0	2950
392510324	2750.0	3240
392510325	2660.0	3420
392510326	2320.0	3470
392510327	2240.0	3620
392510328	2080.0	3680
392510329	2000.0	3920
392510330	1930.0	3970
392510331	1770.0	4120
392510401	1790.0	4540
392510402	1790.0	4710
392510403	1660.0	4900
392510404	1540.0	4730
392510405	2050.0	5480
392510406	6120.0	1960
392510407	5170.0	1770

ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K
392510408	3440.0	5120	392510602	5950.0	1270	392510727	4210.0	3780	392510920	1200.0	1940	392511114	755.0	3480
392510409	2480.0	4880	392510603	5680.0	1340	392510728	3980.0	2060	392510921	929.0	2090	392511115	659.0	3970
392510410	2000.0	6900	392510604	5680.0	1410	392510729	3870.0	2830	392510922	835.0	2200	392511116	710.0	3920
392510411	2000.0	5560	392510605	5300.0	2700	392510730	3440.0	2900	392510923	666.0	2440	392511117	646.0	3490
392510412	1930.0	5350	392510606	5300.0	1470	392510731	3230.0	2020	392510924	632.0	3010	392511118	546.0	3860
392510413	1600.0	4200	392510607	7300.0	1610	392510801	2940.0	2070	392510925	598.0	3620	392511119	479.0	4430
392510414	1540.0	4100	392510608	10100.0	1120	392510802	2750.0	2030	392510926	485.0	4120	392511120	412.0	4560
392510415	1520.0	4860	392510609	14600.0	1330	392510803	2480.0	1750	392510927	692.0	2210	392511121	365.0	4700
392510416	1370.0	5170	392510610	16900.0	1560	392510804	2400.0	1690	392510928	966.0	3740	392511122	350.0	4720
392510417	1290.0	4310	392510611	28600.0	1530	392510805	2160.0	1700	392510929	652.0	2820	392511123	690.0	4480
392510418	1220.0	4210	392510612	49600.0	1270	392510806	2000.0	1720	392510930	428.0	2030	392511124	1100.0	2850
392510419	1220.0	4100	392510613	45600.0	853	392510807	1860.0	1740	392511001	365.0	3640	392511125	2740.0	2740
392510420	1260.0	4100	392510614	33100.0	675	392510808	1720.0	1770	392511002	355.0	4390	392511126	3540.0	1630
392510421	3200.0	3150	392510615	39300.0	579	392510809	1410.0	1800	392511003	325.0	4960	392511127	3760.0	2130
392510422	6670.0	1690	392510616	34700.0	776	392510810	1370.0	1740	392511004	275.0	4910	392511128	3540.0	2020
392510423	6230.0	1690	392510617	24200.0	654	392510811	2830.0	1410	392511005	236.0	5090	392511129	2750.0	2360
392510424	4800.0	4280	392510618	17000.0	730	392510812	2550.0	1380	392511006	290.0	5440	392511130	2240.0	3660
392510425	3650.0	5010	392510619	14200.0	877	392510813	1660.0	1870	392511007	316.0	5070	392511201	1600.0	6270
392510426	3230.0	5750	392510620	13000.0	940	392510814	1260.0	2830	392511008	320.0	5550	392511202	1200.0	5360
392510427	2840.0	4980	392510621	12100.0	860	392510815	938.0	2800	392511009	293.0	5520	392511203	1020.0	5460
392510428	2240.0	3200	392510622	12400.0	1100	392510816	732.0	2780	392511010	266.0	5000	392511204	866.0	5290
392510429	1860.0	2750	392510623	11300.0	1150	392510817	725.0	2820	392511011	245.0	5260	392511205	803.0	4460
392510430	1660.0	2910	392510624	10800.0	1080	392510818	956.0	3400	392511012	253.0	5330	392511206	680.0	4410
392510501	2270.0	2510	392510625	10800.0	987	392510819	878.0	2450	392511013	266.0	5250	392511207	639.0	4810
392510502	3760.0	1650	392510626	10100.0	802	392510820	811.0	3700	392511014	240.0	5410	392511208	732.0	5080
392510503	8780.0	1810	392510627	11100.0	1040	392510821	718.0	2900	392511015	240.0	5820	392511209	835.0	5050
392510504	8570.0	3030	392510628	9410.0	934	392510822	598.0	2960	392511016	236.0	5970	392511210	835.0	4770
392510505	6670.0	2950	392510629	7810.0	984	392510823	552.0	3460	392511017	224.0	5980	392511211	795.0	5160
392510506	4680.0	2320	392510630	6090.0	1110	392510824	509.0	3630	392511018	210.0	5900	392511212	763.0	5710
392510507	3980.0	2250	392510701	5950.0	1280	392510825	462.0	3180	392511019	736.0	6210	392511213	688.0	5800
392510508	3330.0	1840	392510702	7810.0	1530	392510826	468.0	4460	392511020	680.0	3160	392511214	632.0	5930
392510509	3130.0	1550	392510703	10600.0	963	392510827	423.0	4050	392511021	420.0	4100	392511215	528.0	6200
392510510	2840.0	1480	392510704	8570.0	963	392510828	350.0	4110	392511022	320.0	3640	392511216	479.0	6910
392510511	2240.0	1660	392510705	6980.0	1610	392510829	345.0	4350	392511023	320.0	3830	392511217	439.0	6090
392510512	1930.0	1790	392510706	6520.0	2180	392510830	316.0	4800	392511024	311.0	4740	392511218	439.0	6290
392510513	1420.0	2110	392510707	5950.0	2100	392510831	284.0	5830	392511025	284.0	4930	392511219	434.0	6610
392510514	1160.0	2710	392510708	5950.0	2280	392510901	297.0	6180	392511026	444.0	4910	392511220	428.0	6420
392510515	1080.0	3350	392510709	5170.0	2200	392510902	284.0	6530	392511027	3200.0	1260	392511221	375.0	6590
392510516	1260.0	3490	392510710	4920.0	1800	392510903	253.0	5730	392511028	3620.0	1650	392511222	391.0	7760
392510517	1310.0	3560	392510711	4920.0	1480	392510904	236.0	5960	392511029	2480.0	2100	392511223	391.0	6570
392510518	1100.0	4650	392510712	4680.0	1440	392510905	320.0	5130	392511030	2320.0	5750	392511224	391.0	7070
392510519	52000.0	1080	392510713	4440.0	1410	392510906	960.0	2910	392511031	2610.0	5750	392511225	380.0	7490
392510520	47200.0	1400	392510714	3980.0	1470	392510907	951.0	2480	392511101	4440.0	7820	392511226	365.0	6870
392510521	38500.0	1550	392510715	3870.0	1470	392510908	1750.0	2280	392511102	4800.0	2620	392511227	391.0	9200
392510522	25000.0	1710	392510716	3540.0	1510	392510909	3440.0	6130	392511103	4320.0	2140	392511228	375.0	9150
392510523	18100.0	1420	392510717	3440.0	1510	392510910	2750.0	3360	392511104	3440.0	3180	392511229	365.0	7550
392510524	14200.0	1710	392510718	3330.0	1570	392510911	2750.0	2280	392511105	2480.0	2960	392511230	355.0	6940
392510525	12400.0	1420	392510719	3440.0	1560	392510912	3230.0	1910	392511106	1860.0	2930	392511231	355.0	7570
392510526	9640.0	1180	392510720	3330.0	2190	392510913	4560.0	2220	392511107	1480.0	3950	392520101	350.0	7720
392510527	8380.0	1290	392510721	3130.0	1940	392510914	4680.0	2920	392511108	1180.0	5100	392520102	345.0	8260
392510528	8940.0	1400	392510722	2940.0	1840	392510915	4100.0	3210	392511109	1100.0	3800	392520103	414.0	9300
392510529	14800.0	1060	392510723	2840.0	1750	392510916	3440.0	2200	392511110	1000.0	3670	392520104	860.0	6010
392510530	10100.0	1060	392510724	2750.0	1600	392510917	3040.0	1880	392511111	844.0	3520	392520105	1200.0	5820
392510531	9860.0	1810	392510725	2840.0	1760	392510918	2400.0	1840	392511112	1050.0	3250	392520106	1230.0	6330
392510601	7460.0	1470	392510726	3230.0	1990	392510919	1660.0	1680	392511113	1010.0	3130	392520107	1420.0	6690

ID No.	Flow	K
392520108	1930.0	8600
392520109	2080.0	9940
392520110	1660.0	10400
392520111	1400.0	9840
392520112	1270.0	8940
392520113	1160.0	7750
392520114	1040.0	7260
392520115	912.0	7130
392520116	827.0	6710
392520117	787.0	7140
392520118	787.0	6950
392520119	748.0	6050
392520120	725.0	5850
392520121	795.0	6150
392520122	912.0	5650
392520123	1070.0	4780
392520124	974.0	5230
392520125	852.0	5270
392520126	920.0	6690
392520127	779.0	9530
392520128	693.0	9130
392520129	566.0	9000
392520130	503.0	8250
392520131	485.0	8180
392520201	516.0	9160
392520202	795.0	8180
392520203	1380.0	5000
392520204	2080.0	5500
392520205	2000.0	5520
392520206	1660.0	11800
392520207	1250.0	8030
392520208	929.0	6030
392520209	748.0	6830
392520210	652.0	7530
392520211	578.0	6510
392520212	516.0	6510
392520213	451.0	6010
392520214	417.0	6120
392520215	386.0	6540
392520216	445.0	6800
392520217	528.0	6800
392520218	478.0	6800
392520219	956.0	6720
392520220	1020.0	7160
392520221	1050.0	6410
392520222	1020.0	6470
392520223	965.0	6700
392520224	860.0	7050
392520225	2420.0	5670
392520226	4340.0	3180
392520227	5550.0	6670
392520228	4920.0	5270
392520229	4440.0	4360
392520301	3650.0	7550
392520302	3130.0	3340
392520303	7500.0	1550
392520304	14200.0	1360
392520305	10700.0	1960
392520306	8780.0	2090
392520307	6980.0	3160
392520308	6230.0	1770
392520309	5170.0	1800
392520310	6000.0	1170
392520311	15500.0	789
392520312	13000.0	1930
392520313	8980.0	2300
392520314	6820.0	1140
392520315	5820.0	1030
392520316	4920.0	1040
392520317	4210.0	1250
392520318	4210.0	1350
392520319	5170.0	1220
392520320	5170.0	1380
392520321	4920.0	1760
392520322	4320.0	2380
392520323	3540.0	3940
392520324	2940.0	3560
392520325	2750.0	2470
392520326	2400.0	2500
392520327	2000.0	2200
392520328	1790.0	2470
392520329	1540.0	2650
392520330	1420.0	3130
392520331	2060.0	2400
392520401	3440.0	1960
392520402	3760.0	1810
392520403	2660.0	3840
392520404	3880.0	2470
392520405	5170.0	2140
392520406	5040.0	2040
392520407	3540.0	3400
392520408	2570.0	4010
392520409	1930.0	4520
392520410	1660.0	5380
392520411	1860.0	3740
392520412	6000.0	1420
392520413	23000.0	649
392520414	18000.0	2110
392520415	14600.0	1430
392520416	11200.0	2950
392520417	5520.0	1490
392520418	3980.0	1850
392520419	3650.0	1770
392520420	7030.0	1470
392520421	24000.0	1050
392520422	33000.0	1290
392520423	68000.0	573
392520424	44000.0	609
392520425	27000.0	721
392520426	17000.0	573
392520427	11000.0	778
392520428	9200.0	1050
392520429	7810.0	1270
392520430	7130.0	1250
392520501	6520.0	1330
392520502	5170.0	1600
392520503	4560.0	2960
392520504	3650.0	2200
392520505	3230.0	3310
392520506	2750.0	4000
392520507	2320.0	3470
392520508	2000.0	3310
392520509	1790.0	3270
392520510	1530.0	2840
392520511	1330.0	2770
392520512	1270.0	2970
392520513	1330.0	3400
392520514	1200.0	3790
392520515	1100.0	3920
392520516	1030.0	3570
392520517	9470.0	3470
392520518	1100.0	2870
392520519	5400.0	3320
392520520	7900.0	3180
392520521	5820.0	3560
392520522	4210.0	2190
392520523	3330.0	1950
392520524	3330.0	2100
392520525	15800.0	2350
392520526	12200.0	1570
392520527	8400.0	1070
392520528	5600.0	1030
392520529	5700.0	873
392520530	8500.0	759
392520531	7000.0	1510
392520601	5700.0	1350
392520602	5700.0	979
392520603	10500.0	2330
392520604	6300.0	1670
392520605	6600.0	994
392520606	5180.0	942
392520607	5050.0	1140
392520608	4320.0	1320
392520609	3130.0	1250
392520610	2000.0	1600
392520611	1500.0	1930
392520612	1250.0	2330
392520613	1070.0	3060
392520614	912.0	3350
392520615	787.0	3860
392520616	680.0	4410
392520617	618.0	4700
392520618	5590.0	4790
392520619	485.0	5060
392520620	435.0	5420
392520621	370.0	5690
392520622	320.0	5880
392520623	293.0	5860
392520624	266.0	6250
392520625	253.0	6380
392520626	232.0	6330
392520627	232.0	6260
392520628	216.0	6210
392520629	212.0	6140
392520630	208.0	6100
392520701	204.0	6140
392520702	212.0	6110
392520703	224.0	6270
392520704	212.0	6670
392520705	204.0	7410
392520706	196.0	6950
392520707	220.0	6890
392520708	262.0	7220
392520709	220.0	5480
392520710	216.0	5090
392520711	208.0	5590
392520712	185.0	6730
392520713	174.0	7680
392520714	260.0	8220
392520715	207.0	7180
392520716	307.0	7050
392520717	1380.0	6260
392520718	2760.0	13600
392520719	2300.0	4920
392520720	2320.0	3120
392520721	2000.0	6360
392520722	1440.0	5250
392520723	1200.0	3560
392520724	1460.0	2980
392520725	1540.0	2320
392520726	1400.0	1440
392520727	1060.0	1280
392520728	770.0	1300
392520729	604.0	1560
392520730	479.0	1810
392520731	412.0	2230
392520801	355.0	2470
392520802	302.0	2900
392520803	270.0	3440
392520804	240.0	3400
392520805	236.0	3860
392520806	566.0	3700
392520807	492.0	3540
392520808	365.0	2580
392520809	503.0	3740
392520810	456.0	3820
392520811	360.0	4180
392520812	340.0	4480
392520813	325.0	4240
392520814	307.0	5750
392520815	266.0	4960
392520816	266.0	5450
392520817	316.0	5960
392520818	279.0	5560
392520819	232.0	5400
392520820	196.0	4850
392520821	174.0	5700
392520822	152.0	6350
392520823	174.0	6120
392520824	142.0	4850
392520825	126.0	4840
392520826	139.0	5090
392520827	266.0	6080
392520828	200.0	3340
392520829	152.0	3940
392520830	133.0	4390
392520831	123.0	5200
392520901	103.0	5440
392520902	83.0	5400
392520903	78.0	5370
392520904	71.0	5360
392520905	64.0	5230
392520906	60.0	5100
392520907	58.0	4990
392520908	54.0	4800
392520909	51.0	5020
392520910	50.0	5100
392520911	48.0	5240
392520912	48.0	5390
392520913	46.0	5380
392520914	45.0	5380
392520915	44.0	5350
392520916	40.0	5100
392520917	39.0	5030
392520918	39.0	4930
392520919	38.0	4820
392520920	37.0	4820
392520921	65.0	4180
392520922	118.0	4030
392520923	2000.0	6800
392520924	1000.0	2680
392520925	386.0	1890
392520926	270.0	3050
392520927	185.0	5290
392520928	129.0	5730
392520929	100.0	5440
392520930	75.0	5280
392521001	71.0	5200
392521002	65.0	5300
392521003	60.0	5590
392521004	54.0	6380
392521005	51.0	6500
392521006	69.0	6200
392521007	64.0	6000
392521008	54.0	5790

ID No.	Flow	K
392521009	50.0	5910
392521010	46.0	5830
392521011	42.0	4690
392521012	40.0	5070
392521013	38.0	5400
392521014	38.0	5540
392521015	37.0	5450
392521016	35.0	5490
392521017	34.0	5350
392521018	31.0	5280
392521019	30.0	5180
392521020	28.0	5060
392521021	25.0	4800
392521022	26.0	4670
392521023	25.0	4600
392521024	25.0	4540
392521025	26.0	4530
392521026	25.0	4420
392521027	25.0	4500
392521028	25.0	4700
392521029	25.0	4910
392521030	24.0	5250
392521031	23.0	5530
392521101	25.0	5750
392521102	26.0	6010
392521103	25.0	6230
392521104	24.0	6210
392521105	25.0	6210
392521106	25.0	6410
392521107	26.0	6800
392521108	27.0	7110
392521109	23.0	7510
392521110	22.0	7250
392521111	24.0	7430
392521112	24.0	7640
392521113	28.0	8210
392521114	31.0	8830
392521115	31.0	9140
392521116	34.0	8880
392521117	40.0	9310
392521118	64.0	9120
392521119	56.0	9530
392521120	58.0	10800
392521121	58.0	10200
392521122	60.0	10700
392521123	80.0	10700
392521124	139.0	10300
392521125	386.0	7100
392521126	1000.0	5200
392521127	2000.0	2360
392521128	1540.0	7290
392521129	1060.0	10800
392521130	695.0	12300
392521201	516.0	16000
392521202	428.0	18900
392521203	391.0	18600
392521204	360.0	15200
392521205	320.0	14800
392521206	288.0	13700
392521207	262.0	11100
392521208	249.0	10400
392521209	232.0	14400
392521210	208.0	10700
392521211	192.0	10100
392521212	181.0	9400
392521213	178.0	8660
392521214	170.0	8340
392521215	163.0	8130
392521216	156.0	8150
392521217	156.0	8730
392521218	156.0	8650
392521219	204.0	8380
392521220	236.0	8670
392521221	523.0	9360
392521222	659.0	4250
392521223	516.0	5800
392521224	456.0	6960
392521225	396.0	8090
392521226	350.0	10500
392521227	325.0	11300
392521228	288.0	11800
392521229	262.0	12700
392521230	249.0	11700
392521231	232.0	13400
392530101	212.0	12900
392530102	200.0	12500
392530103	181.0	12800
392530104	185.0	13000
392530105	181.0	12900
392530106	178.0	13000
392530107	170.0	12400
392530108	163.0	11400
392530109	159.0	11100
392530110	159.0	11300
392530111	146.0	11600
392530112	146.0	11700
392530113	139.0	11600
392530114	136.0	11000
392530115	139.0	11000
392530116	123.0	11600
392530117	123.0	12300
392530118	149.0	11800
392530119	149.0	10800
392530120	159.0	11900
392530121	149.0	12600
392530122	149.0	11700
392530123	196.0	11300
392530124	232.0	11500
392530125	232.0	11800
392530126	224.0	11500
392530127	228.0	12600
392530128	245.0	12300
392530129	258.0	14000
392530130	266.0	14300
392530131	266.0	14100
392530201	266.0	14400
392530202	249.0	15200
392530203	232.0	14200
392530204	220.0	13500
392530205	196.0	13800
392530206	192.0	13900
392530207	178.0	14500
392530208	170.0	13600
392530209	152.0	12800
392530210	159.0	12000
392530211	170.0	11500
392530212	192.0	11500
392530213	200.0	13200
392530214	306.0	12800
392530215	503.0	7840
392530216	439.0	8260
392530217	345.0	10800
392530218	288.0	13100
392530219	270.0	13000
392530220	293.0	12800
392530221	245.0	13400
392530222	224.0	12900
392530223	240.0	13700
392530224	375.0	9940
392530225	391.0	7990
392530226	355.0	11400
392530227	311.0	13400
392530228	297.0	13500
392530301	424.0	15000
392530302	1120.0	9650
392530303	1780.0	5060
392530304	1730.0	4550
392530305	1750.0	4280
392530306	1410.0	5150
392530307	1650.0	7870
392530308	2090.0	14800
392530309	1630.0	7700
392530310	1590.0	5020
392530311	1420.0	4230
392530312	1140.0	3730
392530313	938.0	3970
392530314	4240.0	2520
392530315	9290.0	1500
392530316	11000.0	531
392530317	16000.0	378
392530318	25800.0	927
392530319	17400.0	501
392530320	16200.0	1170
392530321	14500.0	1200
392530322	8820.0	913
392530323	3240.0	1860
392530324	2300.0	3380
392530325	1750.0	4440
392530326	1360.0	4880
392530327	1030.0	4010
392530328	835.0	3240
392530329	680.0	3360
392530330	1900.0	3630
392530331	25000.0	904
392530401	26000.0	2180
392530402	13000.0	2220
392530403	7000.0	1460
392530404	10000.0	1310
392530405	6000.0	1680
392530406	7000.0	1340
392530407	17000.0	1120
392530408	17000.0	1810
392530409	11500.0	1670
392530410	5500.0	1380
392530411	4400.0	1260
392530412	3920.0	1160
392530413	3920.0	1000
392530414	3450.0	840
392530415	5910.0	767
392530416	7440.0	646
392530417	5170.0	1560
392530418	3390.0	1430
392530419	2500.0	1830
392530420	1710.0	4830
392530421	1650.0	3970
392530422	1410.0	2800
392530423	1260.0	3180
392530424	21000.0	1010
392530425	48000.0	1240
392530426	30000.0	1120
392530427	20000.0	500
392530428	16500.0	435
392530429	19000.0	520
392530430	22000.0	991
392530501	17000.0	407
392530502	16000.0	383
392530503	9400.0	432
392530504	3020.0	816
392530505	2010.0	1530
392530506	1600.0	2070
392530507	1370.0	2520
392530508	1180.0	2940
392530509	1040.0	3120
392530510	965.0	3340
392530511	1360.0	3200
392530512	6000.0	1900
392530513	34000.0	532
392530514	25000.0	1440
392530515	22500.0	694
392530516	22000.0	563
392530517	20000.0	1630
392530518	16000.0	1600
392530519	9200.0	3150
392530520	6500.0	1910
392530521	5360.0	1620
392530522	4190.0	1790
392530523	3270.0	1480
392530524	2320.0	1640
392530525	1750.0	2070
392530526	1350.0	2700
392530527	1090.0	2970
392530528	912.0	2810
392530529	748.0	2750
392530530	611.0	2860
392530531	516.0	3080
392530601	468.0	3260
392530602	423.0	3500
392530603	386.0	3940
392530604	345.0	4340
392530605	302.0	4560
392530606	345.0	4760
392530607	365.0	4940
392530608	386.0	5380
392530609	479.0	5940
392530610	820.0	7100
392530611	869.0	13400
392530612	604.0	13000
392530613	462.0	10000
392530614	365.0	9520
392530615	211.0	10500
392530616	279.0	12000
392530617	249.0	9230
392530618	212.0	7880
392530619	170.0	7860
392530620	149.0	7890
392530621	129.0	7720
392530622	114.0	7940
392530623	139.0	7820
392530624	149.0	6920
392530625	120.0	6910
392530626	114.0	7000
392530627	106.0	7050
392530628	120.0	7380
392530629	129.0	7740
392530630	106.0	7730
392530701	97.0	8520
392530702	100.0	9030
392530703	87.0	9750
392530704	73.0	10500
392530705	64.0	9850
392530706	54.0	9350
392530707	97.0	8760
392530708	159.0	7740
392530709	109.0	6320
392530710	80.0	6060

ID No.	Flow	K
392530711	428.0	7170
392530712	2490.0	16200
392530713	4680.0	4190
392530714	4190.0	5470
392530715	4190.0	3110
392530716	3270.0	3900
392530717	2660.0	2190
392530718	5360.0	1940
392530719	6360.0	3630
392530720	4200.0	2320
392530721	50000.0	861
392530722	48000.0	1170
392530723	35000.0	808
392530724	27000.0	512
392530725	32000.0	492
392530726	20000.0	1550
392530727	14000.0	841
392530728	6000.0	705
392530729	4260.0	958
392530730	3920.0	1000
392530731	3270.0	1040
392530801	3600.0	1600
392530802	3450.0	1340
392530803	1820.0	1430
392530804	983.0	1710
392530805	1070.0	2130
392530806	2860.0	1840
392530807	6170.0	3800
392530808	2570.0	2120
392530809	1470.0	2350
392530810	1220.0	5610
392530811	1040.0	5170
392530812	1120.0	3490
392530813	1010.0	3550
392530814	1300.0	3930
392530815	2590.0	9700
392530816	1290.0	6800
392530817	947.0	5600
392530818	886.0	5700
392530819	2900.0	4720
392530820	7220.0	3640
392530821	3950.0	1550
392530822	2300.0	3030
392530823	1600.0	3120
392530824	1140.0	1730
392530825	1040.0	1840
392530826	1480.0	1930
392530827	2620.0	2400
392530828	2240.0	2700
392530829	1510.0	2700
392530830	1010.0	3000
392530831	866.0	3060
392530901	1080.0	2840
392530902	1010.0	2940
392530903	878.0	2780
392530904	13700.0	1350
392530905	10500.0	1060
392530906	4870.0	1260
392530907	2570.0	1760
392530908	1380.0	2060
392530909	1030.0	2120
392530910	718.0	2810
392530911	572.0	3030
392530912	456.0	3530
392530913	451.0	4590
392530914	355.0	5360
392530915	2970.0	5520
392530916	275.0	5410
392530917	224.0	5310
392530918	204.0	5600
392530919	189.0	6210
392530920	170.0	6170
392530921	163.0	5920
392530922	146.0	6090
392530923	146.0	6310
392530924	146.0	6890
392530925	146.0	6890
392530926	149.0	7150
392530927	146.0	7110
392530928	136.0	6730
392530929	123.0	6700
392530930	112.0	6730
392531001	95.0	7110
392531002	90.0	6900
392531003	102.0	7040
392531004	1430.0	3030
392531005	740.0	3180
392531006	4000.0	2130
392531007	1450.0	1810
392531008	600.0	3630
392531009	451.0	5930
392531010	350.0	6190
392531011	284.0	6000
392531012	232.0	6490
392531013	196.0	7550
392531014	174.0	7920
392531015	156.0	8380
392531016	146.0	8890
392531017	126.0	11600
392531018	120.0	10900
392531019	114.0	9860
392531020	103.0	9680
392531021	97.0	8730
392531022	149.0	8490
392531023	548.0	10600
392531024	15500.0	6240
392531025	15600.0	2560
392531026	13900.0	1970
392531027	19300.0	2210
392531028	13100.0	1870
392531029	9770.0	1270
392531030	7220.0	1330
392531031	4940.0	1440
392531101	3740.0	1550
392531102	2920.0	1680
392531103	2260.0	1990
392531104	2220.0	2640
392531105	2950.0	3060
392531106	6570.0	2640
392531107	4940.0	4050
392531108	2280.0	5260
392531109	1330.0	5360
392531110	1010.0	5080
392531111	852.0	4630
392531112	255.0	4540
392531113	695.0	4830
392531114	639.0	5670
392531115	592.0	6250
392531116	559.0	6750
392531117	522.0	7380
392531118	503.0	8250
392531119	539.0	8770
392531120	1300.0	6680
392531121	12000.0	5770
392531122	14500.0	2460
392531123	7600.0	2380
392531124	4500.0	2230
392531125	3000.0	2220
392531126	1800.0	2730
392531127	1310.0	2840
392531128	1090.0	3170
392531129	965.0	3350
392531130	852.0	3810
392531201	725.0	4790
392531202	688.0	5650
392531203	1100.0	4910
392531204	11400.0	2280
392531205	12300.0	3840
392531206	6780.0	2330
392531207	3630.0	2190
392531208	2640.0	1850
392531209	2260.0	2380
392531210	1940.0	2520
392531211	1820.0	2560
392531212	1630.0	3450
392531213	1460.0	3590
392531214	1390.0	3060
392531215	1200.0	3080
392531216	974.0	3440
392531217	819.0	4100
392531218	725.0	4900
392531219	688.0	5430
392531220	659.0	5920
392531221	639.0	6810
392531222	598.0	7580
392531223	528.0	8460
392531224	522.0	8810
392531225	552.0	8100
392531226	522.0	9110
392531227	516.0	10600
392531228	485.0	11800
392531229	451.0	10700
392531230	445.0	11000
392531231	439.0	11100
392540101	439.0	11300
392540102	439.0	12000
392540103	434.0	12000
392540104	417.0	12400
392540105	402.0	12200
392540106	391.0	10100
392540107	380.0	12200
392540108	370.0	12200
392540109	365.0	12100
392540110	360.0	11600
392540111	360.0	11300
392540112	350.0	11000
392540113	365.0	10500
392540114	407.0	12600
392540115	439.0	11900
392540116	670.0	11000
392540117	1680.0	5690
392540118	1940.0	4550
392540119	1410.0	4420
392540120	1330.0	6100
392540121	3400.0	7240
392540122	7000.0	1500
392540123	5000.0	1100
392540124	3000.0	2080
392540125	3000.0	5270
392540126	5500.0	3060
392540127	6000.0	2100
392540128	4200.0	2590
392540129	2600.0	3090
392540130	2000.0	4640
392540131	1270.0	6830
392540201	1060.0	7360
392540202	9120.0	7300
392540203	811.0	8120
392540204	732.0	8890
392540205	673.0	8430
392540206	611.0	7940
392540207	540.0	8050
392540208	546.0	7700
392540209	546.0	9110
392540210	528.0	8610
392540211	485.0	8380
392540212	439.0	9590
392540213	434.0	8870
392540214	434.0	8850
392540215	417.0	9310
392540216	407.0	10400
392540217	391.0	11500
392540218	375.0	10700
392540219	350.0	9950
392540220	1250.0	7110
392540221	3400.0	2660
392540222	2400.0	4110
392540223	1400.0	6060
392540224	1350.0	10500
392540225	1200.0	11700
392540226	827.0	10900
392540227	740.0	11700
392540228	639.0	11800
392540301	566.0	8000
392540302	528.0	7890
392540303	474.0	8490
392540304	434.0	8130
392540305	417.0	8310
392540306	391.0	7650
392540307	370.0	6710
392540308	365.0	7830
392540309	335.0	8360
392540310	311.0	8020
392540311	297.0	8710
392540312	284.0	9870
392540313	275.0	11000
392540314	258.0	11800
392540315	249.0	12400
392540316	245.0	12800
392540317	240.0	13100
392540318	236.0	13000
392540319	232.0	13700
392540320	228.0	14200
392540321	224.0	14000
392540322	220.0	13800
392540323	225.0	12900
392540324	390.0	8380
392540325	1000.0	3710
392540326	1300.0	4610
392540327	1300.0	5600
392540328	2200.0	17700
392540329	2000.0	15600
392540330	1600.0	9720
392540331	1200.0	5880
392540401	827.0	5230
392540402	646.0	5030
392540403	540.0	6170
392540404	462.0	8510
392540405	386.0	6620
392540406	340.0	6140
392540407	302.0	6670
392540408	249.0	7950
392540409	220.0	9050
392540410	212.0	8730
392540411	208.0	8850

ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K
392530711	428.0	7170	392530904	13700.0	1350	392531029	9770.0	1270	392531223	528.0	8460	392540216	407.0	10400
392530712	2490.0	16200	392530905	10500.0	1060	392531030	7220.0	1330	392531224	522.0	8810	392540217	391.0	11500
392530713	4680.0	4190	392530906	4870.0	1260	392531031	4940.0	1440	392531225	552.0	8100	392540218	375.0	10700
392530714	4190.0	6470	392530907	2570.0	1760	392531101	3740.0	1550	392531226	522.0	9110	392540219	350.0	9950
392530715	4190.0	3110	392530908	1380.0	2060	392531102	2920.0	1680	392531227	516.0	10600	392540220	1250.0	7110
392530716	3270.0	3990	392530909	1030.0	2120	392531103	2260.0	1990	392531228	485.0	11800	392540221	3400.0	2660
392530717	2660.0	2190	392530910	718.0	2810	392531104	2220.0	2640	392531229	451.0	10700	392540222	2400.0	4110
392530718	5360.0	1940	392530911	572.0	3030	392531105	2950.0	3060	392531230	445.0	11000	392540223	1400.0	6060
392530719	6360.0	3630	392530912	456.0	3530	392531106	6570.0	2640	392531231	430.0	11100	392540224	1350.0	10500
392530720	4200.0	2320	392530913	451.0	4590	392531107	4940.0	4050	392540101	430.0	11300	392540225	1200.0	11700
392530721	50000.0	861	392530914	355.0	5360	392531108	2280.0	5260	392540102	430.0	12000	392540226	827.0	10900
392530722	48000.0	1170	392530915	2970.0	5520	392531109	1330.0	5360	392540103	434.0	12000	392540227	740.0	11700
392530723	35000.0	808	392530916	275.0	5410	392531110	1010.0	5080	392540104	417.0	12400	392540228	639.0	11800
392530724	27000.0	512	392530917	224.0	5310	392531111	852.0	4630	392540105	402.0	12200	392540301	566.0	8000
392530725	32000.0	492	392530918	204.0	5600	392531112	255.0	4540	392540106	391.0	10100	392540302	528.0	7890
392530726	20000.0	1560	392530919	189.0	6210	392531113	695.0	4830	392540107	380.0	12200	392540303	474.0	8490
392530727	14000.0	841	392530920	170.0	6170	392531114	639.0	5670	392540108	370.0	12200	392540304	434.0	8130
392530728	6000.0	705	392530921	163.0	5920	392531115	592.0	6250	392540109	365.0	12100	392540305	417.0	8310
392530729	4260.0	958	392530922	146.0	6000	392531116	559.0	6750	392540110	360.0	11600	392540306	391.0	7650
392530730	3920.0	1000	392530923	146.0	6310	392531117	522.0	7380	392540111	360.0	11300	392540307	370.0	6710
392530731	3270.0	1040	392530924	146.0	6890	392531118	503.0	8250	392540112	350.0	11000	392540308	365.0	7830
392530801	3600.0	1600	392530925	146.0	6880	392531119	539.0	8770	392540113	365.0	10500	392540309	335.0	8360
392530802	3450.0	1340	392530926	149.0	7150	392531120	1300.0	6680	392540114	407.0	12600	392540310	311.0	8020
392530803	1820.0	1430	392530927	146.0	7110	392531121	12000.0	5770	392540115	439.0	11900	392540311	297.0	8710
392530804	983.0	1710	392530928	136.0	6730	392531122	14500.0	2460	392540116	670.0	11000	392540312	284.0	9870
392530805	1070.0	2130	392530929	123.0	6700	392531123	7600.0	2380	392540117	1680.0	5690	392540313	275.0	11000
392530806	2860.0	1840	392530930	112.0	6730	392531124	4500.0	2230	392540118	1940.0	4550	392540314	258.0	11800
392530807	6170.0	3800	392531001	95.0	7110	392531125	3000.0	2220	392540119	1410.0	4420	392540315	249.0	12400
392530808	2570.0	2120	392531002	90.0	6900	392531126	1800.0	2730	392540120	1330.0	6100	392540316	245.0	12800
392530809	1470.0	2350	392531003	102.0	7040	392531127	1310.0	2840	392540121	3400.0	7240	392540317	240.0	13100
392530810	1220.0	5610	392531004	1430.0	3030	392531128	1090.0	3170	392540122	7000.0	1500	392540318	236.0	13000
392530811	1040.0	5170	392531005	740.0	3180	392531129	965.0	3350	392540123	5000.0	1190	392540319	232.0	13700
392530812	1120.0	3490	392531006	4000.0	2130	392531130	852.0	3810	392540124	3000.0	2080	392540320	228.0	14200
392530813	1010.0	3550	392531007	1450.0	1810	392531201	725.0	4790	392540125	3000.0	5270	392540321	224.0	14000
392530814	1300.0	3930	392531008	600.0	3630	392531202	688.0	5650	392540126	5500.0	3060	392540322	220.0	13800
392530815	2590.0	9700	392531009	451.0	5930	392531203	1100.0	4910	392540127	6000.0	2100	392540323	225.0	12900
392530816	1290.0	6800	392531010	350.0	6190	392531204	11400.0	2280	392540128	4200.0	2590	392540324	390.0	8380
392530817	947.0	5600	392531011	284.0	6000	392531205	12300.0	3840	392540129	2600.0	3090	392540325	1000.0	3710
392530818	886.0	5700	392531012	232.0	6490	392531206	6780.0	2330	392540130	2000.0	4640	392540326	1300.0	4610
392530819	2900.0	4720	392531013	196.0	7550	392531207	3630.0	2190	392540131	1270.0	6830	392540327	1300.0	5600
392530820	7220.0	3640	392531014	174.0	7920	392531208	2640.0	1850	392540201	1060.0	7360	392540328	2200.0	17700
392530821	3950.0	1550	392531015	156.0	8380	392531209	2260.0	2380	392540202	9120.0	7300	392540329	2000.0	15600
392530822	2300.0	3030	392531016	146.0	8880	392531210	1940.0	2520	392540203	811.0	8120	392540330	1600.0	9720
392530823	1600.0	3120	392531017	126.0	11600	392531211	1820.0	2560	392540204	732.0	8890	392540331	1200.0	5880
392530824	1140.0	1730	392531018	120.0	10900	392531212	1630.0	3450	392540205	673.0	8430	392540401	827.0	5230
392530825	1040.0	1840	392531019	114.0	9860	392531213	1460.0	3590	392540206	611.0	7940	392540402	646.0	5030
392530826	1480.0	1930	392531020	103.0	9680	392531214	1390.0	3060	392540207	540.0	8050	392540403	540.0	6170
392530827	2620.0	2400	392531021	97.0	8730	392531215	1200.0	3080	392540208	546.0	7700	392540404	462.0	8510
392530828	2240.0	2700	392531022	149.0	8490	392531216	974.0	3460	392540209	546.0	9110	392540405	386.0	6620
392530829	1510.0	2700	392531023	548.0	10600	392531217	819.0	4100	392540210	528.0	8610	392540406	340.0	6140
392530830	1010.0	3000	392531024	15500.0	6240	392531218	725.0	4900	392540211	485.0	8380	392540407	302.0	6670
392530831	866.0	3060	392531025	15600.0	2560	392531219	688.0	5430	392540212	439.0	9590	392540408	249.0	7950
392530901	1080.0	2840	392531026	13900.0	1970	392531220	659.0	5920	392540213	434.0	8870	392540409	220.0	9050
392530902	1010.0	2940	392531027	19300.0	2210	392531221	639.0	6810	392540214	434.0	8850	392540410	212.0	8730
392530903	878.0	2790	392531028	13100.0	1870	392531222	598.0	7580	392540215	417.0	9310	392540411	208.0	8850

ID No.	Flow	K
392540412	232.0	8880
392540413	307.0	9610
392540414	380.0	9460
392540415	485.0	9410
392540416	491.0	13100
392540417	462.0	12000
392540418	546.0	14400
392540419	552.0	10600
392540420	417.0	10600
392540421	325.0	12900
392540422	335.0	13800
392540423	451.0	13100
392540424	479.0	12600
392540425	439.0	10500
392540426	396.0	9480
392540427	365.0	10600
392540428	395.0	10500
392540429	750.0	7650
392540430	1500.0	4630
392540501	70000.0	2420
392540502	122000.0	914
392540503	98000.0	531
392540504	74000.0	693
392540505	37500.0	602
392540506	23000.0	662
392540507	12000.0	933
392540508	10000.0	1020
392540509	8300.0	1080
392540510	14000.0	1210
392540511	24300.0	1870
392540512	29200.0	1440
392540513	33000.0	1030
392540514	27000.0	1110
392540515	14000.0	1200
392540516	10000.0	1230
392540517	7200.0	1330
392540518	7000.0	1720
392540519	4600.0	1970
392540520	4000.0	2650
392540521	3790.0	3370
392540522	2860.0	3330
392540523	2090.0	3720
392540524	1940.0	3740
392540525	3820.0	3790
392540526	3200.0	3060
392540527	16500.0	2130
392540528	12000.0	4306
392540529	14000.0	2060
392540530	8400.0	1720
392540531	6000.0	2370
392540601	3600.0	3180
392540602	2810.0	2850
392540603	3220.0	2620
392540604	2540.0	2330
392540605	1850.0	2330
392540606	1560.0	2710
392540607	1300.0	2960
392540608	4000.0	737
392540609	4000.0	1650
392540610	3330.0	3220
392540611	2240.0	2300
392540612	1700.0	3380
392540613	1350.0	4030
392540614	1160.0	4580
392540615	1060.0	5390
392540616	1180.0	5580
392540617	3000.0	5830
392540618	3000.0	7350
392540619	1800.0	5570
392540620	1180.0	6520
392540621	1100.0	6500
392540622	800.0	7520
392540623	740.0	8750
392540624	7160.0	9320
392540625	5640.0	8180
392540626	450.0	7480
392540627	400.0	6370
392540628	3480.0	6370
392540629	295.0	6630
392540630	300.0	6810
392540701	342.0	6560
392540702	285.0	4940
392540703	256.0	6600
392540704	238.0	7160
392540705	229.0	7490
392540706	224.0	7420
392540707	252.0	7330
392540708	265.0	7490
392540709	252.0	6240
392540710	204.0	5790
392540711	180.0	5960
392540712	158.0	6470
392540713	151.0	6390
392540714	141.0	6900
392540715	131.0	7580
392540716	125.0	7770
392540717	109.0	7390
392540718	98.0	7750
392540719	101.0	7820
392540720	118.0	4540
392540721	98.0	7410
392540722	95.0	7900
392540723	87.0	7930
392540724	84.0	7960
392540725	82.0	7950
392540726	72.0	8810
392540727	67.0	8160
392540728	60.0	7660
392540729	60.0	7380
392540730	60.0	7270
392540731	62.0	7350
392540801	74.0	7660
392540802	74.0	6640
392540803	79.0	7230
392540804	77.0	9850
392540805	84.0	10200
392540806	104.0	10600
392540807	138.0	11600
392540808	141.0	12500
392540809	131.0	13100
392540810	112.0	12500
392540811	95.0	12300
392540812	72.0	12400
392540813	62.0	12600
392540814	54.0	12200
392540815	49.0	12000
392540816	42.0	11500
392540817	34.0	10800
392540818	33.0	10300
392540819	30.0	9680
392540820	28.0	9300
392540821	27.0	8730
392540822	26.0	8000
392540823	26.0	8050
392540824	24.0	7890
392540825	23.0	7750
392540826	23.0	7600
392540827	23.0	7240
392540828	23.0	6950
392540829	23.0	6900
392540830	23.0	6750
392540831	28.0	6370
392540901	31.0	6370
392540902	23.0	5930
392540903	20.0	5840
392540904	18.0	5650
392540905	16.0	5260
392540906	15.0	4980
392540907	17.0	4790
392540908	18.0	4640
392540909	18.0	4530
392540910	18.0	4320
392540911	15.0	4140
392540912	13.0	4170
392540913	12.0	3890
392540914	13.0	3870
392540915	13.0	3750
392540916	13.0	3690
392540917	12.0	3660
392540918	12.0	3590
392540919	12.0	3540
392540920	12.0	3550
392540921	12.0	3560
392540922	12.0	3530
392540923	11.0	3360
392540924	11.0	3270
392540925	11.0	3250
392540926	11.0	3210
392540927	11.0	3260
392540928	10.0	3120
392540929	12.0	3160
392540930	24.0	2570
392541001	33.0	2990
392541002	26.0	2980
392541003	26.0	2860
392541004	22.0	2770
392541005	18.0	2710
392541006	18.0	2640
392541007	16.0	2620
392541008	14.0	2640
392541009	14.0	2590
392541010	13.0	2540
392541011	14.0	2660
392541012	28.0	2470
392541013	30.0	2360
392541014	50.0	2400
392541015	80.0	3050
392541016	176.0	6170
392541017	138.0	9290
392541018	388.0	13100
392541019	388.0	4130
392541020	310.0	3080
392541021	247.0	3880
392541022	300.0	2510
392541023	475.0	3670
392541024	759.0	4820
392541025	486.0	5050
392541026	400.0	2820
392541027	359.0	2770
392541028	337.0	3330
392541029	305.0	3430
392541030	220.0	3520
392541031	151.0	4090
392541101	104.0	4440
392541102	79.0	5130
392541103	77.0	5450
392541104	87.0	5680
392541105	82.0	6020
392541106	70.0	5900
392541107	67.0	6180
392541108	62.0	6470
392541109	60.0	6270
392541110	58.0	6420
392541111	56.0	6700
392541112	54.0	6930
392541113	52.0	7150
392541114	54.0	7600
392541115	52.0	7870
392541116	52.0	7940
392541117	52.0	7690
392541118	58.0	8040
392541119	58.0	8300
392541120	58.0	8580
392541121	58.0	8650
392541122	54.0	8800
392541123	47.0	8640
392541124	42.0	8830
392541125	37.0	9070
392541126	34.0	9070
392541127	31.0	9190
392541128	31.0	9520
392541129	28.0	9660
392541130	26.0	9520
392541201	31.0	9190
392541202	31.0	8990
392541203	33.0	8630
392541204	33.0	8410
392541205	34.0	8370
392541206	33.0	8810
392541207	33.0	9240
392541208	34.0	9650
392541209	34.0	9730
392541210	33.0	9970
392541211	42.0	9970
392541212	92.0	8340
392541213	87.0	8370
392541214	92.0	9230
392541215	109.0	9810
392541216	148.0	10000
392541217	196.0	9500
392541218	166.0	7960
392541219	141.0	8890
392541220	118.0	10700
392541221	101.0	11200
392541222	87.0	11100
392541223	77.0	11900
392541224	72.0	11700
392541225	67.0	11600
392541226	70.0	12100
392541227	95.0	11400
392541228	480.0	4860
392541229	3100.0	2330
392541230	3650.0	1450
392541231	3150.0	3010
392550101	2300.0	7280
392550102	1600.0	15300
392550103	1220.0	16600
392550104	900.0	15500
392550105	532.0	14500
392550106	444.0	13200
392550107	354.0	14600
392550108	295.0	11900
392550109	280.0	9770
392550110	305.0	8160
392550111	310.0	8330

ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K
392550112	332.0	8780	392550308	380.0	11000	392550502	275.0	5180	392550626	2780.0	3420	392550820	424.0	3590
392550113	332.0	8210	392550309	300.0	9220	392550503	265.0	4950	392550627	3260.0	3670	392550821	320.0	4620
392550114	364.0	9750	392550310	220.0	7830	392550504	332.0	4550	392550628	3010.0	2340	392550822	439.0	5030
392550115	450.0	7810	392550311	230.0	7560	392550505	290.0	12500	392550629	2700.0	3060	392550823	406.0	3290
392550116	1040.0	7540	392550312	200.0	6280	392550506	280.0	15500	392550630	2400.0	3250	392550824	415.0	4370
392550117	1700.0	4970	392550313	180.0	6720	392550507	370.0	8830	392550701	2000.0	2740	392550825	950.0	3930
392550118	1900.0	4300	392550314	170.0	6400	392550508	550.0	5230	392550702	2900.0	2500	392550826	710.0	4770
392550119	1400.0	3960	392550315	170.0	6400	392550509	2150.0	4020	392550703	4000.0	2130	392550827	710.0	2760
392550120	980.0	4780	392550316	800.0	3940	392550510	2100.0	3760	392550704	3000.0	1760	392550828	520.0	3500
392550121	1040.0	5830	392550317	1850.0	859	392550511	880.0	3740	392550705	2200.0	1900	392550829	1200.0	1480
392550122	1200.0	6810	392550318	1650.0	1140	392550512	1200.0	4530	392550706	1600.0	2100	392550830	1500.0	3420
392550123	680.0	6090	392550319	3100.0	1330	392550513	9400.0	2970	392550707	1200.0	2430	392550831	3500.0	2150
392550124	580.0	6300	392550320	6000.0	553	392550514	11000.0	5590	392550708	1400.0	3270	392550901	3500.0	1410
392550125	480.0	8910	392550321	21000.0	703	392550515	7700.0	2920	392550709	4000.0	1780	392550902	2700.0	1830
392550126	300.0	9670	392550322	21000.0	2910	392550516	5000.0	2160	392550710	2700.0	2840	392550903	1600.0	13200
392550127	280.0	8980	392550323	19000.0	1770	392550517	4000.0	1930	392550711	2180.0	1900	392550905	610.0	8000
392550128	270.0	11400	392550324	16000.0	1060	392550518	2200.0	2680	392550712	1800.0	1840	392550906	450.0	6580
392550129	260.0	13200	392550325	12000.0	1060	392550519	1800.0	4710	392550713	1500.0	2000	392550907	350.0	5890
392550130	230.0	12700	392550326	4000.0	2430	392550520	1600.0	3380	392550714	1140.0	1940	392550908	250.0	5780
392550131	230.0	12600	392550327	2600.0	2280	392550521	72000.0	1340	392550715	822.0	2060	392550909	169.0	5720
392550201	180.0	12600	392550328	1800.0	2210	392550522	68000.0	989	392550716	634.0	2230	392550910	231.0	5880
392550202	200.0	12200	392550329	1300.0	2270	392550523	32000.0	1070	392550717	548.0	2190	392550911	212.0	4860
392550203	130.0	10700	392550330	1000.0	2540	392550524	28000.0	1240	392550718	598.0	2380	392550912	300.0	6760
392550204	200.0	10900	392550331	800.0	2690	392550525	32400.0	1360	392550719	650.0	2470	392550913	430.0	5300
392550205	300.0	8110	392550401	1700.0	2230	392550526	16800.0	1340	392550720	3500.0	2530	392550914	400.0	3200
392550206	2200.0	5380	392550402	4000.0	1080	392550527	18000.0	1040	392550721	2000.0	1730	392550915	437.0	6850
392550207	2200.0	2100	392550403	2800.0	950	392550528	15000.0	1210	392550722	1000.0	4350	392550916	400.0	11100
392550208	1800.0	2940	392550404	1400.0	1640	392550529	16200.0	1260	392550723	690.0	6660	392550917	280.0	18900
392550209	1650.0	10000	392550405	1100.0	2380	392550530	12800.0	1320	392550724	661.0	9950	392550918	224.0	17100
392550210	1200.0	19900	392550406	1200.0	4270	392550531	10600.0	1480	392550725	615.0	9680	392550919	220.0	8550
392550211	800.0	14800	392550407	700.0	4810	392550601	10200.0	1310	392550726	430.0	10100	392550920	184.0	8350
392550212	600.0	12900	392550408	650.0	5290	392550602	9200.0	1310	392550727	364.0	9010	392550921	151.0	9530
392550213	480.0	12000	392550409	570.0	5560	392550603	8200.0	1290	392550728	320.0	9840	392550922	148.0	9460
392550214	360.0	9650	392550410	470.0	6150	392550604	4400.0	1470	392550729	280.0	10300	392550923	208.0	6580
392550215	350.0	10700	392550411	530.0	6570	392550605	2800.0	2460	392550730	247.0	9710	392550924	350.0	6350
392550216	290.0	8680	392550412	570.0	5580	392550606	2700.0	3270	392550731	216.0	8370	392550925	4000.0	1010
392550217	260.0	7990	392550413	540.0	5170	392550607	4000.0	1960	392550801	212.0	6860	392550926	5000.0	1340
392550218	250.0	8940	392550414	7000.0	2120	392550608	3200.0	1720	392550802	204.0	6080	392550926	5000.0	1340
392550219	360.0	6340	392550415	4500.0	5470	392550609	2120.0	2680	392550803	204.0	6160	392550927	5000.0	2330
392550220	5500.0	930	392550416	3200.0	6830	392550610	2700.0	4350	392550804	215.0	5880	392550928	12000.0	1160
392550221	4800.0	895	392550417	1800.0	5810	392550611	2080.0	3190	392550805	680.0	8070	392550929	6000.0	2270
392550222	3900.0	594	392550418	1100.0	5050	392550612	3230.0	3300	392550806	660.0	4210	392550930	6500.0	2700
392550223	3600.0	1220	392550419	900.0	4350	392550613	1980.0	2690	392550807	625.0	3980	392551001	4000.0	1400
392550224	2100.0	3970	392550420	700.0	4070	392550614	1660.0	3310	392550808	854.0	3860	392551002	7750.0	1130
392550225	1250.0	4520	392550421	1100.0	1100	392550615	1660.0	3920	392550809	886.0	2810	392551003	4980.0	786
392550226	900.0	6390	392550422	7000.0	882	392550616	1780.0	3630	392550810	920.0	4020	392551004	3500.0	1310
392550227	800.0	7750	392550423	4500.0	882	392550617	1320.0	4570	392550811	650.0	7220	392551005	13500.0	1120
392550228	550.0	7920	392550424	2700.0	1590	392550618	7000.0	2710	392550812	550.0	9970	392551006	23400.0	888
392550301	700.0	4260	392550425	1240.0	1820	392550619	4700.0	2110	392550813	3200.0	4140	392551007	24200.0	1530
392550302	2200.0	3500	392550426	700.0	1870	392550620	4700.0	7440	392550814	2400.0	6940	392551008	14700.0	1240
392550303	1000.0	2590	392550427	652.0	2280	392550621	2910.0	3090	392550815	1700.0	6530	392551009	8240.0	1070
392550304	1250.0	5750	392550428	548.0	2790	392550622	2960.0	3770	392550816	854.0	5070	392551010	7040.0	942
392550305	900.0	8600	392550429	451.0	3180	392550623	2620.0	5920	392550817	942.0	4830	392551011	6160.0	836
392550306	600.0	10100	392550430	376.0	4090	392550624	3400.0	5410	392550818	843.0	3470	392551012	4380.0	851
392550307	500.0	10900	392550501	337.0	5020	392550625	2910.0	3930	392550819	616.0	3030	392551013	3570.0	904

ID No.	Flow	K
392551014	3260.0	871
392551015	2740.0	384
392551016	2100.0	1020
392551017	1590.0	1380
392551018	1310.0	1830
392551019	1150.0	2090
392551020	999.0	2380
392551021	886.0	2600
392551022	790.0	2860
392551023	700.0	3020
392551024	625.0	3310
392551025	556.0	3450
392551026	508.0	3480
392551027	458.0	4030
392551028	451.0	4700
392551029	418.0	5030
392551030	406.0	5090
392551031	382.0	4970
392551101	370.0	5510
392551102	364.0	5570
392551103	326.0	5990
392551104	305.0	6120
392551105	300.0	6260
392551106	295.0	6480
392551107	280.0	6950
392551108	2650.0	7360
392551109	256.0	7560
392551110	247.0	7620
392551111	242.0	6700
392551112	247.0	7220
392551113	242.0	7600
392551114	238.0	7600
392551115	234.0	7680
392551116	216.0	7280
392551117	212.0	7500
392551118	220.0	7660
392551119	234.0	7840
392551120	224.0	8030
392551121	220.0	8040
392551122	224.0	7650
392551123	256.0	8050
392551124	234.0	8050
392551125	208.0	8500
392551126	192.0	8260
392551127	200.0	8550
392551128	184.0	8650
392551129	173.0	9000
392551130	173.0	8970
392551201	200.0	8970
392551202	204.0	8950
392551203	220.0	9300
392551204	212.0	9310
392551205	212.0	10400
392551206	200.0	10600
392551207	196.0	10800
392551208	204.0	11000
392551209	196.0	10900
392551210	192.0	10900
392551211	196.0	11100
392551212	184.0	11200
392551213	184.0	11700
392551214	184.0	12200
392551215	180.0	12900
392551216	169.0	13500
392551217	162.0	14200
392551218	166.0	14500
392551219	162.0	13700
392551220	169.0	12900
392551221	169.0	13000
392551222	169.0	13100
392551223	173.0	12800
392551224	173.0	12700
392551225	173.0	13300
392551226	169.0	13700
392551227	166.0	13900
392551228	166.0	13400
392551229	166.0	12600
392551230	169.0	13300
392551231	169.0	13200
392560101	166.0	12900
392560102	166.0	13200
392560103	166.0	13500
392560104	166.0	13400
392560105	166.0	12800
392560106	169.0	13100
392560107	162.0	13700
392560108	155.0	13800
392560109	151.0	13400
392560110	144.0	13500
392560111	144.0	13500
392560112	141.0	12600
392560113	141.0	11200
392560114	138.0	11900
392560115	141.0	11900
392560116	141.0	13200
392560117	141.0	13000
392560118	141.0	13400
392560119	131.0	13700
392560120	128.0	13700
392560121	138.0	13300
392560122	192.0	12200
392560123	247.0	11900
392560124	265.0	12100
392560125	295.0	12600
392560126	337.0	13800
392560127	348.0	15000
392560128	382.0	13600
392560129	354.0	13700
392560130	315.0	14800
392560131	295.0	17400
392560201	380.0	18000
392560202	444.0	14100
392560203	430.0	13800
392560204	564.0	12700
392560205	607.0	10800
392560206	580.0	9510
392560207	516.0	8900
392560208	556.0	10200
392560209	800.0	11800
392560210	1340.0	6410
392560211	1660.0	3370
392560212	1120.0	4050
392560213	840.0	5310
392560214	760.0	6700
392560215	620.0	9530
392560216	680.0	11100
392560217	700.0	9400
392560218	1960.0	8410
392560219	7200.0	1890
392560220	5000.0	2300
392560221	2410.0	1740
392560222	1500.0	2700
392560223	1130.0	3630
392560224	801.0	4830
392560225	749.0	6390
392560226	661.0	7600
392560227	589.0	5480
392560228	493.0	4880
392560229	430.0	5150
392560301	388.0	5370
392560302	348.0	5600
392560303	337.0	6000
392560304	305.0	6280
392560305	275.0	7310
392560306	270.0	7290
392560307	242.0	8030
392560308	234.0	8500
392560309	208.0	9030
392560310	192.0	7790
392560311	184.0	8460
392560312	166.0	9150
392560313	180.0	9820
392560314	196.0	8660
392560315	188.0	8480
392560316	196.0	9230
392560317	192.0	9410
392560318	184.0	9920
392560319	176.0	10200
392560320	162.0	10200
392560321	196.0	11100
392560322	265.0	9220
392560323	280.0	8610
392560324	337.0	9920
392560325	354.0	9580
392560326	320.0	10800
392560327	295.0	9810
392560328	275.0	10700
392560329	252.0	11300
392560330	220.0	12300
392560331	220.0	13800
392560401	200.0	13400
392560402	196.0	12600
392560403	208.0	12800
392560404	176.0	12700
392560405	166.0	12900
392560406	162.0	12800
392560407	148.0	12200
392560408	128.0	12600
392560409	155.0	11600
392560410	173.0	11000
392560411	212.0	9940
392560412	242.0	14700
392560413	208.0	15500
392560414	200.0	14300
392560415	200.0	14000
392560416	192.0	13500
392560417	169.0	11700
392560418	220.0	12100
392560419	238.0	10100
392560420	204.0	8660
392560421	166.0	8620
392560422	155.0	8350
392560423	134.0	8440
392560424	138.0	9110
392560425	188.0	8320
392560426	118.0	8320
392560427	115.0	8890
392560428	115.0	9250
392560429	1130.0	2610
392560430	999.0	5580
392560501	1480.0	16000
392560502	1580.0	5700
392560503	2220.0	5420
392560504	2370.0	8730
392560505	1730.0	5980
392560506	1110.0	6080
392560507	769.0	6030
392560508	556.0	5910
392560509	437.0	5670
392560510	376.0	5790
392560511	332.0	5310
392560512	275.0	5580
392560513	229.0	5780
392560514	208.0	5990
392560515	1010.0	2900
392560516	1260.0	1900
392560517	942.0	2030
392560518	540.0	2500
392560519	540.0	4020
392560520	607.0	3000
392560521	444.0	3540
392560522	305.0	5550
392560523	220.0	5040
392560524	1490.0	4850
392560525	5500.0	2970
392560526	16500.0	2330
392560527	16500.0	5360
392560528	8500.0	1810
392560529	3370.0	1950
392560530	2120.0	1930
392560531	4670.0	1980
392560601	6620.0	2130
392560602	7510.0	2410
392560603	4990.0	2040
392560604	4980.0	1760
392560605	3200.0	1360
392560606	3720.0	2030
392560607	2600.0	1410
392560608	2060.0	1520
392560609	1830.0	1470
392560610	1530.0	1400
392560611	1580.0	2480
392560612	1280.0	2720
392560613	987.0	2110
392560614	801.0	2150
392560615	661.0	2650
392560616	564.0	3770
392560617	444.0	3930
392560618	370.0	4030
392560619	337.0	4730
392560620	285.0	4540
392560621	252.0	4150
392560622	220.0	3990
392560623	192.0	3860
392560624	176.0	3810
392560625	169.0	3840
392560626	162.0	3600
392560627	362.0	4110
392560628	749.0	7110
392560629	652.0	14200
392560630	645.0	13100
392560701	444.0	8230
392560702	430.0	8520
392560703	320.0	9580
392560704	280.0	8000
392560705	247.0	7870
392560706	200.0	6670
392560707	173.0	6420
392560708	141.0	6360
392560709	122.0	6500
392560710	101.0	7280
392560711	98.0	7590
392560712	95.0	6850
392560713	79.0	6350
392560714	74.0	5820

ID No.	Flow	K
392560715	67.0	5560
392560716	74.0	5160
392560717	77.0	4840
392560718	87.0	4520
392560719	82.0	6000
392560720	84.0	5690
392560721	84.0	5400
392560722	84.0	5030
392560723	98.0	4530
392560724	151.0	4630
392560725	134.0	7750
392560726	122.0	7270
392560727	104.0	6830
392560728	95.0	7410
392560729	195.0	7000
392560730	234.0	4150
392560731	138.0	2930
392560801	134.0	3140
392560802	131.0	4080
392560803	106.0	4370
392560804	101.0	4130
392560805	104.0	3640
392560806	106.0	3540
392560807	101.0	7650
392560808	84.0	6180
392560809	72.0	4400
392560810	65.0	4210
392560811	51.0	4020
392560812	45.0	4080
392560813	39.0	3970
392560814	33.0	3800
392560815	28.0	3860
392560816	24.0	3850
392560817	21.0	3850
392560818	17.0	3900
392560819	16.0	3890
392560820	15.0	3880
392560821	15.0	3840
392560822	14.0	3880
392560823	13.0	3830
392560824	12.0	3880
392560825	11.0	3870
392560826	10.0	3910
392560827	9.4	3930
392560828	8.5	3930
392560829	7.8	3970
392560830	7.4	3920
392560831	7.4	4030
392560901	6.3	4030
392560902	6.0	4080
392560903	5.5	4010
392560904	5.2	4400
392560905	4.9	4160
392560906	4.6	4140
392560907	4.1	4220

ID No.	Flow	K
392560908	3.9	4230
392560909	3.6	4230
392560910	3.4	4290
392560911	3.0	4240
392560912	2.6	4290
392560913	1.8	4350
392560914	1.9	4420
392580915	1.6	4390
392560916	1.5	4480
392560917	1.5	4520
392560918	1.4	4510
392560919	1.3	4480
392560920	1.1	4450
392560921	1.2	4440
392560922	1.3	4430
392560923	1.6	4450
392560924	1.8	4420
392560925	1.8	4400
392580926	1.6	4360
392560927	1.6	4450
392560928	1.4	4340
392560929	1.2	4470
392560930	1.3	4400

ID No.	Flow	K
508540101	320.0	4940.
508540102	372.0	4610.
508540102	313.0	4990.
508540103	360.0	4850.
508540103	310.0	5000.
508540104	356.0	4780.
508540104	306.0	4830.
508540105	352.0	4730.
508540105	306.0	4770.
508540106	348.0	4990.
508540106	299.0	5050.
508540107	340.0	4920.
508540107	296.0	4950.
508540108	332.0	4860.
508540108	288.0	5100.
508540109	324.0	4970.
508540109	282.0	5060.
508540110	316.0	5130.
508540110	273.0	5050.
508540111	306.0	5010.
508540111	266.0	5040.
508540112	299.0	4990.
508540112	260.0	5050.
508540113	292.0	4770.
508540113	254.0	5020.
508540114	328.0	4900.
508540114	248.0	4980.
508540115	360.0	4480.
508540115	246.0	4840.
508540116	410.0	4800.
508540116	240.0	5070.
508540117	416.0	4800.
508540117	237.0	5110.
508540118	416.0	4700.
508540118	229.0	5170.
508540119	440.0	4910.
508540119	221.0	5030.
508540120	428.0	4890.
508540120	210.0	4990.
508540121	400.0	4500.
508540121	208.0	5290.
508540122	365.0	5520.
508540122	243.0	5270.
508540123	348.0	5440.
508540123	254.0	5410.
508540124	380.0	4180.
508540124	263.0	4740.
508540125	400.0	3900.
508540125	260.0	4740.
508540126	410.0	4450.
508540126	251.0	4410.
508540127	416.0	6090.
508540127	243.0	5470.
508540128	390.0	4400.
508540128	234.0	5450.

ID No.	Flow	K
508540129	365.0	4670.
508540130	348.0	4650.
508540131	332.0	4680.
508540301	223.0	4740.
508540302	213.0	5010.
508540303	208.0	5060.
508540304	203.0	5000.
508540305	198.0	4450.
508540306	195.0	4530.
508540307	195.0	4540.
508540308	193.0	4500.
508540309	195.0	4700.
508540310	195.0	4700.
508540311	203.0	4560.
508540312	205.0	4840.
508540313	203.0	4610.
508540314	200.0	4810.
508540315	195.0	4980.
508540316	190.0	4790.
508540317	188.0	4830.
508540318	186.0	4990.
508540319	186.0	4830.
508540320	186.0	4740.
508540321	195.0	4750.
508540322	198.0	4960.
508540323	198.0	4830.
508540324	190.0	4790.
508540325	183.0	4700.
508540326	190.0	4690.
508540327	220.0	4600.
508540328	250.0	4640.
508540329	260.0	4610.
508540330	240.0	4680.
508540331	240.0	4700.
508540401	226.0	4570.
508540402	213.0	4420.
508540403	200.0	3910.
508540404	190.0	3940.
508540405	181.0	4160.
508540406	176.0	4300.
508540407	181.0	3990.
508540408	183.0	3970.
508540409	176.0	4080.
508540410	172.0	3560.
508540411	221.0	3490.
508540412	660.0	3570.
508540413	2230.0	2670.
508540414	2880.0	2120.
508540415	3540.0	1290.
508540416	3160.0	1720.
508540419	1930.0	2920.
508540420	1590.0	3190.
508540421	1140.0	3530.
508540422	799.0	4020.
508540423	612.0	5750.

ID No.	Flow	K
508540424	564.0	5790.
508540425	458.0	5450.
508540426	428.0	5020.
508540427	620.0	5400.
508540428	826.0	3590.
508540429	1050.0	3220.
508540430	790.0	2580.
508540501	7870.0	964.
508540502	9120.0	774.
508540503	5220.0	776.
508540504	11300.0	1380.
508540505	14600.0	1020.
508540506	9120.0	722.
508540507	4320.0	700.
508540508	2170.0	799.
508540509	1700.0	1170.
508540510	1930.0	1320.
508540511	6970.0	926.
508540512	32300.0	557.
508540513	59000.0	707.
508540514	70400.0	1280.
508540515	73300.0	1520.
508540516	26800.0	1000.
508540517	15600.0	1000.
508540518	10900.0	1500.
508540519	10500.0	1540.
508540520	10900.0	1520.
508540521	7420.0	1430.
508540522	5720.0	2830.
508540523	4620.0	2850.
508540524	4140.0	2600.
508540525	4720.0	2980.
508540526	32300.0	2490.
508540527	40900.0	2450.
508540528	21300.0	1810.
508540529	20600.0	1460.
508540530	17100.0	1460.
508540531	13700.0	1440.
508540601	10500.0	1250.
508540602	7570.0	1200.
508540603	5470.0	1670.
508540604	7870.0	2070.
508540605	8170.0	1920.
508540606	5120.0	2570.
508540607	3160.0	2500.
508540608	6600.0	1700.
508540609	10200.0	1800.
508540610	6970.0	1400.
508540611	6600.0	1640.
508540612	5600.0	1440.
508540613	4620.0	1570.
508540614	8770.0	4200.
508540615	3800.0	3510.
508540616	5720.0	4630.
508540617	4920.0	4610.

ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K	ID No.	Flow	K
508540618	4820.0	3980.	508540812	181.0	4290.	508541006	213.0	4070.	508541201	113.0	4400.	508550125	276.0	4480.
508540619	5220.0	3040.	508540813	172.0	4330.	508541007	195.0	2650.	508541202	110.0	4380.	508550126	246.0	4800.
508540620	3880.0	2550.	508540814	167.0	4240.	508541008	232.0	4070.	508541203	108.0	4480.	508550127	218.0	5320.
508540621	2680.0	2890.	508540815	141.0	4390.	508541009	246.0	4070.	508541204	106.0	4480.	508550128	203.0	4550.
508540622	2110.0	2930.	508540816	154.0	4420.	508541010	243.0	3630.	508541205	105.0	4560.	508550129	200.0	4240.
508540623	1760.0	3770.	508540817	148.0	4390.	508541011	243.0	3780.	508541206	103.0	4540.	508550130	190.0	4710.
508540624	1480.0	4020.	508540818	144.0	4280.	508541012	248.0	2190.	508541207	111.0	4590.	508550131	165.0	4560.
508540625	1270.0	4160.	508540819	138.0	4430.	508541013	234.0	3810.	508541208	113.0	4470.	508550202	148.0	4130.
508540626	1100.0	4060.	508540820	203.0	4200.	508541014	226.0	3560.	508541209	114.0	4390.	508550203	152.0	3980.
508540627	1010.0	5000.	508540821	150.0	4250.	508541015	218.0	4240.	508541210	118.0	4490.	508550204	161.0	3880.
508540628	925.0	4140.	508540822	127.0	4450.	508541016	205.0	4370.	508541211	167.0	4370.	508550205	165.0	3950.
508540629	844.0	4150.	508540823	134.0	4600.	508541017	181.0	4340.	508541212	221.0	4240.	508550206	158.0	4000.
508540630	763.0	4160.	508540824	138.0	4570.	508541018	154.0	3910.	508541213	246.0	3380.	508550207	165.0	4460.
508540701	692.0	4540.	508540825	138.0	4350.	508541019	140.0	3880.	508541214	365.0	3530.	508550208	285.0	4650.
508540702	644.0	4600.	508540826	136.0	4510.	508541020	134.0	3500.	508541215	288.0	3150.	508550209	491.0	3650.
508540703	604.0	4710.	508540827	127.0	4570.	508541021	130.0	3590.	508541216	266.0	4000.	508550210	395.0	3870.
508540704	588.0	4710.	508540828	130.0	4410.	508541022	136.0	3740.	508541217	273.0	2470.	508550211	324.0	3610.
508540705	556.0	4840.	508540829	604.0	4730.	508541023	190.0	3720.	508541218	288.0	2270.	508550212	285.0	3360.
508540706	526.0	4950.	508540830	934.0	6800.	508541024	174.0	3740.	508541219	276.0	3380.	508550213	257.0	3990.
508540707	505.0	5050.	508540831	736.0	8950.	508541025	158.0	4180.	508541220	237.0	4160.	508550214	229.0	3880.
508540708	477.0	5110.	508540901	604.0	7610.	508541026	148.0	4100.	508541221	200.0	4160.	508550215	216.0	4800.
508540709	452.0	5050.	508540902	464.0	7100.	508541027	142.0	4120.	508541222	183.0	3910.	508550216	203.0	5190.
508540710	440.0	4990.	508540903	356.0	6780.	508541028	148.0	3730.	508541223	169.0	3340.	508550217	186.0	4040.
508540711	416.0	5070.	508540904	302.0	6570.	508541029	146.0	3750.	508541224	156.0	3400.	508550218	172.0	3200.
508540712	395.0	4500.	508540905	266.0	5990.	508541030	148.0	4010.	508541225	142.0	3530.	508550219	178.0	3090.
508540713	375.0	4660.	508540906	243.0	6080.	508541031	146.0	4020.	508541226	148.0	3710.	508550220	183.0	3130.
508540714	352.0	4690.	508540907	232.0	6090.	508541101	144.0	3900.	508541227	152.0	4000.	508550221	200.0	3350.
508540715	336.0	4920.	508540908	216.0	5810.	508541102	142.0	4130.	508541228	163.0	3890.	508550222	416.0	4120.
508540716	313.0	4780.	508540909	203.0	5760.	508541103	142.0	4140.	508541229	186.0	3520.	508550223	505.0	3040.
508540717	310.0	4780.	508540910	190.0	5680.	508541104	144.0	4090.	508541230	216.0	3150.	508550224	216.0	2060.
508540718	306.0	4630.	508540911	178.0	5490.	508541106	146.0	4070.	508541231	178.0	3210.	508550225	276.0	2090.
508540719	299.0	4730.	508540912	169.0	5640.	508541107	142.0	4510.	508550101	200.0	3500.	508550226	243.0	2140.
508540720	288.0	4920.	508540913	165.0	5430.	508541108	146.0	4120.	508550102	198.0	3890.	508550227	216.0	2680.
508540721	276.0	4840.	508540914	158.0	5140.	508541108	138.0	4510.	508550103	181.0	3040.	508550228	190.0	3240.
508540722	270.0	4840.	508540915	152.0	5090.	508541109	146.0	4250.	508550104	169.0	3250.	508550301	178.0	2860.
508540723	266.0	4810.	508540916	152.0	4860.	508541110	158.0	3940.	508550105	167.0	3340.	508550302	167.0	2980.
508540724	263.0	4780.	508540917	152.0	4970.	508541111	161.0	3130.	508550106	163.0	3460.	508550303	158.0	3230.
508540725	260.0	4800.	508540918	148.0	5040.	508541112	174.0	3160.	508550107	152.0	3640.	508550304	148.0	3360.
508540726	260.0	4940.	508540919	142.0	5000.	508541113	178.0	3180.	508550108	150.0	3800.	508550305	172.0	3990.
508540727	263.0	4940.	508540920	174.0	4950.	508541114	169.0	3160.	508550109	172.0	3940.	508550306	144.0	4230.
508540728	251.0	4580.	508540921	142.0	5130.	508541115	156.0	3210.	508550110	178.0	3820.	508550307	125.0	4400.
508540729	246.0	4510.	508540922	130.0	5100.	508541116	146.0	3230.	508550111	183.0	3940.	508550308	114.0	4380.
508540730	248.0	4650.	508540923	127.0	4840.	508541117	140.0	3330.	508550112	188.0	4030.	508550309	108.0	4420.
508540731	282.0	3800.	508540924	121.0	4780.	508541118	134.0	3910.	508550113	196.0	4060.	508550310	116.0	4400.
508540801	306.0	3730.	508540925	114.0	4710.	508541119	130.0	3900.	508550114	188.0	4080.	508550311	125.0	4670.
508540802	299.0	3730.	508540926	111.0	4770.	508541120	127.0	3930.	508550115	193.0	4330.	508550312	100.0	4990.
508540803	310.0	3510.	508540927	111.0	4750.	508541121	121.0	4280.	508550116	200.0	4900.	508550313	96.0	4880.
508540804	285.0	3720.	508540928	111.0	4800.	508541122	118.0	4180.	508550117	208.0	4710.	508550314	93.0	4840.
508540805	251.0	4000.	508540929	113.0	4770.	508541122	118.0	4180.	508550118	203.0	4750.	508550315	94.0	5000.
508540806	232.0	4200.	508540930	125.0	4430.	508541123	116.0	4350.	508550119	203.0	4850.	508550316	96.0	5240.
508540807	221.0	4060.	508541001	134.0	4700.	508541124	114.0	4360.	508550120	226.0	4510.	508550317	102.0	5120.
508540808	213.0	4220.	508541002	144.0	4230.	508541125	113.0	4360.	508550121	223.0	4700.	508550318	108.0	4930.
508540809	202.0	3960.	508541003	167.0	4130.	508541126	111.0	4270.	508550122	229.0	4080.	508550319	114.0	4850.
508540810	195.0	4040.	508541004	161.0	4200.	508541127	110.0	4160.	508550123	263.0	5120.	508550320	123.0	4530.
508540811	188.0	4130.	508541005	246.0	4150.	508541128	108.0	4520.	508550124	279.0	4550.	508550321	237.0	1650.

ID No.	Flow	K
508550322	2550.0	1520.
508550323	1170.0	934.
508550324	1090.0	1130.
508550325	1810.0	2850.
508550326	1390.0	2570.
508550327	835.0	1700.
508550328	620.0	1940.
508550329	464.0	1840.
508550330	385.0	1870.
508550331	306.0	1950.
508550401	282.0	2160.
508550402	257.0	2190.
508550403	240.0	2570.
508550404	221.0	2660.
508550405	205.0	2720.
508550406	216.0	1910.
508550407	302.0	1850.
508550408	660.0	2790.
508550409	620.0	2350.
508550410	519.0	1510.
508550411	410.0	1330.
508550412	332.0	2900.
508550413	285.0	2270.
508550414	237.0	2400.
508550415	221.0	3020.
508550416	216.0	3460.
508550417	218.0	3890.
508550418	210.0	3700.
508550419	193.0	4240.
508550420	174.0	4620.
508550421	163.0	4620.
508550422	150.0	3940.
508550423	144.0	3900.
508550424	134.0	4360.
508550425	125.0	4160.
508550426	121.0	4210.
508550427	129.0	4230.
508550428	134.0	4290.
508550429	136.0	4230.
508550430	136.0	4000.
508550501	140.0	4970.
508550502	148.0	5220.
508550503	154.0	5260.
508550504	210.0	2150.
508550505	200.0	2160.
508550506	186.0	3990.
508550507	178.0	4200.
508550508	174.0	4210.
508550509	167.0	3890.
508550510	172.0	4190.
508550511	181.0	3210.
508550512	316.0	3190.
508550513	512.0	3930.
508550514	1370.0	3860.
508550515	8770.0	3970.
508550516	5720.0	3850.
508550517	4220.0	3830.
508550518	3160.0	1050.
508550519	3300.0	1050.
508550520	49000.0	1050.
508550521	70400.0	1580.
508550522	90900.0	1560.
508550523	94900.0	1600.
508550524	29900.0	1540.
508550525	18200.0	1470.
508550526	11300.0	1530.
508550527	8470.0	2350.
508550528	5470.0	2350.
508550529	11700.0	2300.
508550530	10500.0	2350.
508550531	6600.0	2260.
508550601	4220.0	2280.
508550602	3160.0	4240.
508550603	2620.0	4300.
508550604	2420.0	4310.
508550605	13300.0	4270.
508550606	16100.0	4320.
508550607	6470.0	4260.
508550608	5220.0	4260.
508550609	5340.0	3550.
508550610	8770.0	3520.
508550611	6720.0	2130.
508550612	21300.0	2030.
508550613	10500.0	1980.
508550614	5020.0	1550.
508550615	3370.0	1570.
508550616	3020.0	1660.
508550617	6970.0	1590.
508550618	3880.0	1740.
508550619	3540.0	1760.
508550620	6220.0	1890.
508550621	38300.0	2330.
508550622	47200.0	2170.
508550623	33200.0	2270.
508550624	13700.0	2180.
508550625	10200.0	2010.
508550626	6220.0	1880.
508550627	4140.0	2290.
508550628	3230.0	2650.
508550629	2740.0	2890.
508550630	2420.0	3050.
508550701	2170.0	5110.
508550702	12900.0	4550.
508550703	4920.0	4290.
508550704	3160.0	4490.
508550705	2680.0	4630.
508550706	2230.0	4770.
508550707	1870.0	4860.
508550708	1590.0	4870.
508550709	1340.0	4980.
508550710	1160.0	4840.
508550711	1040.0	4880.
508550712	925.0	5030.
508550713	835.0	5120.
508550714	781.0	5250.
508550715	718.0	5440.
508550716	660.0	5340.
508550718	526.0	5690.
508550719	470.0	5760.
508550720	452.0	5580.
508550721	556.0	4650.
508550722	2230.0	2840.
508550723	2360.0	2830.
508550724	2050.0	2740.
508550725	1420.0	2600.
508550726	1240.0	3580.
508550727	1640.0	5130.
508550728	1350.0	6410.
508550729	1030.0	5790.
508550730	862.0	5250.
508550731	745.0	5180.
508550801	676.0	5030.
508550802	1590.0	5240.
508550803	1760.0	7730.
508550804	1410.0	5510.
508550805	1260.0	5820.
508550806	1170.0	5850.
508550807	1400.0	4260.
508550808	862.0	3800.
508550809	1060.0	3290.
508550810	925.0	4130.
508550811	1290.0	4250.
508550812	1080.0	5290.
508550813	808.0	3390.
508550814	660.0	3390.
508550815	564.0	5210.
508550816	533.0	4040.
508550817	491.0	4330.
508550818	470.0	4340.
508550819	464.0	5360.
508550820	477.0	5110.
508550821	434.0	5510.
508550822	405.0	5570.
508550823	380.0	5380.
508550824	365.0	5770.
508550825	360.0	5640.
508550826	352.0	5640.
508550827	344.0	5310.
508550828	336.0	5670.
508550829	336.0	5750.
508550830	328.0	5340.
508550831	316.0	5100.
508550901	302.0	5070.
508550902	302.0	5120.
508550903	324.0	5150.
508550904	422.0	4880.
508550905	564.0	5030.
508550906	519.0	5040.
508550907	428.0	4880.
508550908	375.0	5130.
508550909	340.0	4190.
508550910	316.0	4190.
508550911	332.0	4030.
508550912	332.0	3970.
508550913	324.0	3970.
508550914	310.0	3970.
508550915	292.0	4360.
508550916	279.0	4380.
508550917	292.0	4420.
508550918	310.0	4460.
508550919	299.0	4600.
508550920	279.0	5340.
508550921	266.0	2870.
508550922	266.0	5090.
508550923	400.0	4540.
508550924	1190.0	2030.
508550925	2680.0	2630.
508550926	3880.0	891.
508550927	19400.0	772.
508550928	15600.0	636.
508550929	15600.0	654.
508550930	12900.0	673.

APPENDIX B

OIL PRODUCTION AND CORRESPONDING CHLORIDES FOR BASIN

Canadian River near Whitefield, Oklahoma

Water Year	Oil Production (1000's Bbls.)	Chlorides* (1000's tons)
1947	151,072	2461
1948	166,064	2078
1949	170,318	2931
1950	176,000	3206
1951	202,540	2306
1952	208,850	1809
1953	217,866	1657
1954	205,954	2170
1955	213,062	1735
1956	235,391	946

*Yearly average flow and yearly weighted average chloride concentration used in calculations.

Wichita River at Wichita Falls, Texas

Month	Oil Production (1000's Bbls.)	Chlorides (1000's tons)
July, 1959	914	Unavailable
August	906	Unavailable
September	881	15.3
October	895	21.0
November	886	7.8
December	914	17.2
January, 1960	913	13.2
February	880	10.4
March	963	7.0
April	947	7.8
May	955	Unavailable
June	928	16.2
July	987	20.6
August	1018	11.9

Wichita River at Wichita Falls, Texas
(continued)

Month	Oil Production (1000's Pbls.)	Chlorides (1000's tons)
September, 1960	986	10.5
October	1020	13.7
November	997	23.2
December	1023	14.7

APPENDIX C

USUAL STATISTICAL PARAMETERS FOR DATA

Item	Average	μ_2	μ_3	μ_4	β_1	β_2	B_s	σ
Sta. 508 Composite Samples--Water Years '53 and '55--190 pieces								
Flow (cfs)	1628	2.455×10^{7}	8.766×10^{11}	3.888×10^{16}	7.20	64.5	0.72	4955
Chlorides (ppm)	902	1.892×10^{2}	3.580×10^{7}	1.289×10^{11}	0.43	3.60	-0.23	435
(tons/day)	2192	1.953×10^{7}	4.174×10^{11}	1.238×10^{16}	4.84	32.5	0.66	4420
Total Dissolved Solids (ppm)	2283	1.044×10^{6}	3.773×10^{8}	3.619×10^{12}	0.35	3.32	-0.17	1022
(tons/day)	6260	1.871×10^{8}	1.304×10^{13}	1.255×10^{18}	5.10	35.8	0.60	13,680
Sta. 392--Composite Samples--Water Years '47-'56--1040 pieces								
Flow (cfs)	5069	9.950×10^{7}	4.247×10^{12}	2.700×10^{17}	4.28	27.3	0.49	9975
Chlorides (ppm)	1458	1.503×10^{6}	2.330×10^{9}	1.001×10^{13}	1.26	4.43	0.31	1226
Total Dissolved Solids (ppm)	2760	4.789×10^{6}	1.328×10^{10}	1.025×10^{14}	1.27	4.47	0.25	2188
Sta. 392--Instantaneous Samples--Water Years '47-'56--3653 pieces								
Flow (cfs)	5097	1.843×10^{8}	1.743×10^{13}	2.453×10^{18}	6.97	72.2	0.57	1358
Chlorides (tons/day)	6363	8.627×10^{7}	3.629×10^{12}	2.585×10^{17}	4.53	34.7	0.27	9288
Total Dissolved Solids (tons/day)	12,145	3.143×10^{8}	2.524×10^{13}	3.431×10^{18}	4.53	34.7	0.27	17,730

USUAL STATISTICAL PARAMETERS FOR DATA
(continued)

Item	Average	μ_2	μ_3	μ_4	β_1	β_2	B_s	σ
Sta. 508--Instantaneous Samples--Parts of Years '54 and '55--632 pieces								
Flow (cfs)	2712	8.203×10^{7}	4.857×10^{12}	3.574×10^{17}	6.54	53.1	0.76	9057
Chlorides (tons/day)	3361	8.022×10^{7}	4.197×10^{12}	2.778×10^{17}	5.84	43.2	0.60	8957
Total Dissolved Solids (tons/day)	9220	6.035×10^{8}	8.660×10^{13}	1.573×10^{19}	5.84	43.2	0.60	24,567

DEFINITION OF STATISTICAL TERMS

$\bar{X} = \sum_{i=1}^{N} X_i/N$ — Arithmetic Mean or Average

$\mu_k = \sum_{i=1}^{N} (X_i - \bar{X})^k/N$ — Moments about the Mean

$\beta_1 = \mu_3/\mu_2^{1.5}$ — Pearson Skewness

$\beta_2 = \mu_4/\mu_2^{2}$ — Kurtosis

$B_s = \dfrac{(Q_3 - Q_2) - (Q_2 - Q_1)}{(Q_3 - Q_2) + (Q_2 - Q_1)}$ — Bowley Skewness

$\sigma = \sqrt{\mu_2}$ — Standard Deviation

X_i = the individual variates in the set.

μ_k = the kth moment about the mean.

i = the indexing parameter.

Q_i = the ith quartile of the data; i.e., 75% of the individual variates smaller than the 3rd quartile.

APPENDIX D

TABULATED VALUES FOR MODIFIED CAUCHY

K= $\angle_{\text{mode}}^{q=}$	.2	.4	.6	.8	1.0 median	1.5	2.0	3.0	4.0	5.0	10	20	50	$\frac{h(\text{median})}{h(\text{mode})}$
0.1	.124	.062	.042	.031	.025	.017	.012	.008	.006	.005	.002	.001	.000	
0.2	.244	.124	.083	.062	.050	.033	.025	.016	.012	.010	.005	.002	.001	
0.3	.354	.184	.124	.094	.075	.050	.037	.024	.018	.014	.007	.003	.001	
0.4	.452	.242	.165	.125	.100	.066	.049	.032	.023	.018	.008	.004	.001	
0.5	.534	.297	.205	.156	.125	.082	.061	.039	.028	.021	.009	.004	.001	
0.6	.599	.348	.244	.187	.150	.099	.072	.045	.032	.024	.010	.004	.001	
0.7	.647	.395	.283	.217	.175	.114	.083	.050	.035	.026	.010	.003	.001	
0.8	.678	.438	.320	.248	.200	.130	.093	.055	.037	.027	.009	.003	.001	
0.9	.693	.477	.356	.278	.225	.145	.102	.059	.039	.028	.009	.003	.001	
1.0	.694	.510	.391	.309	.250	.160	.111	.063	.040	.028	.008	.002	.000	
1.1 .063	.684	.539	.424	.339	.275	.175	.119	.065	.040	.027	.007	.002	.000	.361
1.2 .136	.663	.562	.456	.368	.300	.189	.127	.067	.040	.027	.007	.002	.000	.444
1.3 .176	.636	.581	.486	.398	.325	.202	.134	.068	.040	.025	.006	.001	.000	.511
1.4 .278	.602	.595	.515	.427	.350	.216	.139	.068	.038	.024	.005	.001	.000	.567
1.5 .342	.565	.604	.542	.456	.375	.228	.145	.068	.037	.023	.004	.001	.000	.615
1.6 .401	.526	.609	.567	.484	.400	.240	.149	.067	.035	.021	.004	.001	.000	.655
1.7 .452	.486	.611	.590	.513	.425	.252	.153	.066	.034	.019	.003	.001	.000	.691
1.8 .499	.446	.608	.611	.540	.450	.263	.156	.064	.032	.018	.003	.000	.000	.721
1.9 .541	.407	.603	.631	.568	.475	.274	.158	.062	.030	.016	.002	.000	.000	.747
2.0 .577	.370	.595	.649	.595	.500	.284	.160	.060	.028	.015	.002	.000	.000	.769

TABULATED VALUES FOR MODIFIED CAUCHY
(continued)

K=	q=mode	.2	.4	.6	.8	1.0 median	1.5	2.0	3.0	4.0	5.0	10	20	50	h(median)/h(mode)
2.1	.584	.334	.584	.665	.622	.525	.294	.161	.058	.026	.013	.002	.000	.000	.789
2.2	.640	.301	.571	.679	.648	.550	.302	.161	.055	.024	.012	.001	.000	.000	.807
2.3	.667	.270	.556	.691	.673	.575	.311	.161	.053	.022	.011	.001	.000	.000	.822
2.4	.691	.242	.539	.702	.699	.600	.318	.161	.050	.020	.010	.001	.000	.000	.836
2.5	.712	.216	.522	.710	.723	.625	.326	.160	.047	.018	.009	.001	.000	.000	.845
2.6	.731	.192	.503	.718	.748	.650	.332	.158	.045	.017	.008	.001	.000	.000	.859
2.7	.750	.171	.484	.723	.772	.675	.338	.156	.042	.015	.007	.001	.000	.000	.868
2.8	.766	.151	.464	.727	.795	.700	.344	.154	.039	.014	.006	.000	.000	.000	.877
2.9	.780	.134	.444	.729	.818	.725	.348	.151	.037	.013	.005	.000	.000	.000	.885
3.0	.794	.118	.424	.730	.840	.750	.353	.148	.034	.011	.005	.000	.000	.000	.892
3.1	.806	.104	.404	.730	.862	.775	.356	.145	.032	.010	.004	.000	.000	.000	.899
3.2	.817	.092	.384	.728	.883	.800	.360	.142	.030	.009	.004	.000	.000	.000	.905
3.3	.827	.081	.365	.725	.903	.835	.362	.138	.028	.008	.003	.000	.000	.000	.910
3.4	.836	.071	.346	.721	.923	.850	.364	.134	.026	.007	.003	.000	.000	.000	.915
3.5	.845	.062	.327	.716	.943	.875	.366	.131	.024	.007	.002	.000	.000	.000	.920
3.6	.854	.054	.309	.710	.961	.900	.367	.127	.022	.006	.002	.000	.000	.000	.924
3.7	.861	.048	.292	.703	.980	.925	.368	.123	.020	.005	.002	.000	.000	.000	.928
3.8	.868	.042	.275	.695	.997	.950	.368	.119	.019	.005	.002	.000	.000	.000	.932
3.9	.874	.037	.259	.687	1.014	.975	.368	.115	.017	.004	.001	.000	.000	.000	.936
4.0	.880	.032	.243	.677	1.031	1.000	.367	.111	.016	.004	.001	.000	.000	.000	.939